

Scientific Review AND SCIENTIFIC AND LITERARY REVIEW,

A RECORD OF PROGRESS IN ARTS, INDUSTRY, AND MANUFACTURES,

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Journal of the Inventors' Institute.

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THE INVENTORS' INSTITUTE

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THE various efforts which have been made, and the numerous influences now at work to injure, if not to destroy, Patent Rights; the inefficiency of the many well intended, but ill considered, schemes of Patent Law Reform which have from time to time been suggested, and the tendency of which has generally been to prejudice the Inventor, without advantage to the Public; together with the proceedings so essentially involving the interests of inventors which have already taken place in Parliament, show the necessity of an immediate and active co-operation on the part of those interested in Inventions and in Patent Property, and that an Association for the Protection and Defence of Patent Rights is urgently needed. This Institute has, therefore, been established for the purpose of uniting and organizing the influence of Inventors, Patentees and others. Its objects are:—

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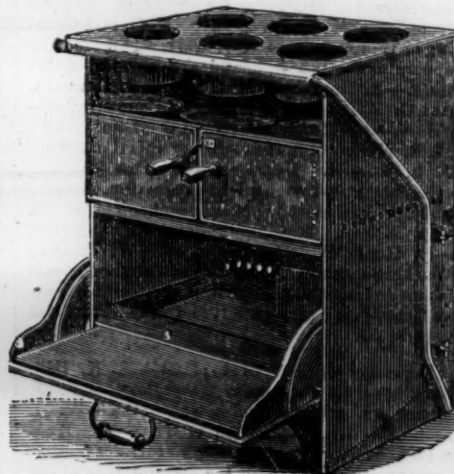
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.. In this list (Com.) means Invention communicated from abroad.

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On November 27th.—4065 to 4078.—J. Sowerby. Presses used in moulding glass. G. J. Newton. Apparatus applicable to twist lace machines.—P. Purdie. Nails, buds, sprigs and rivets, and means employed for manufacturing the same.—W. S. Lyle. Rolling tea-leaf.—S. Emsley and S. Smith. Spinning and twisting worsted, cotton, silk, or other fibrous substances. (Complete specification.)—J. Smith. Looms for weaving, and apparatus connected therewith.—A. MacMillan. Buttons, and fastenings for same.—W. G. Rothwell. Screw-propellers for ships and other navigable vessels.—P. Pieri and W. Smith. Shot or projectiles, and construction and mode of mounting ordnance for discharging such projectiles.—J. W. Lamb and S. Lowe. Knitting machinery.—Sir J. Anderson and W. H. Ash. Electric telegraphs.—B. J. B. Mills. Escapements (com.)—W. R. Lake. Method of repairing spinning rings (com.)—W. R. Lake. Machine for lasting boots and shoes (com.)

On November 28th.—4079 to 4092.—G. Young-husband, G. T. Young-husband, W. Rockliffe, and J. W. Rockliffe. Composition suitable for preserving the bottoms of ships, boats, and similar vessels.—W. A. Lytle. Manufacture of iron and steel.—W. Parkinson. Lawn mowers.—J. Phillips. Arrangements to be applied to lathes for shaping wood, bone, ivory, and other substances or materials to an oval form.—G. Pocknell. Method of communicating between the guard of a train in motion and the station-master during the transit from station to station.—A. V. Newton. Cooling air for cooling and ventilating purposes (com.)—E. Wigzell, J. Pollit, and W. Mellor. Straps or belts for driving machinery.—J. Clough. Method of signalling trains. (Complete specification.)—T. N. Palmer. Bleaching wool, textile fabrics, and fibres (com.)—W. R. Lake. Lubricating apparatus for the spindle-steps and bolsters of spinning frames, and for other bearings (com.)—F. Rhind. Lamps.—J. L. Petit. Ink-pencil.—C. L. Light. Roads and other ways, and preparation of blocks of wood suitable for such roads and ways.—J. W. Wagstaffe. Machinery for collecting and turning hay and loose straw.

On November 30th.—4093 to 4109.—B. G. Devoe and W. L. Walker. Metallic fences.—G. W. Risien. Apparatus for extracting the juice and crystallizable matter from sugar cane, and after manipulation of the same (com.)—J. Clough.

Apparatus employed in the washing and cleansing of wool and other fibres.—S. Farnsworth and S. Sansom. Apparatus used in forming moulds for the casting of metals.—W. Jack. Invalid bedsteads.—F. L. V. Dale and A. Vandenweghe. Children's carriage with turning body.—G. D. Sampson. Connecting the straps of harness.—E. G. Brewer. Steam boilers (com.).—T. B. Bishop. Sewing machines (com.).—C. Vincent. Windmills.—A. Michel. Hives or apparatus for breeding and cultivating oysters.—W. Morgan-Brown. Suspending and controlling the motion of berths, cabins, sofas, tables, and other like articles in ships or in travelling carriages (com.).—A. C. Henderson. Rectilinear web looms (com.).—G. A. Adams. Indicating and recording the state of the tide.—J. A. Salmon. Furnaces for steam boilers and other purposes.—J. B. Deluy. Disincrusting and preventing the incrustations in steam boilers.—W. R. Lake. Harvesting machines. (Complete specification.)

On December 1st.—4110 to 4129.—T. W. Wilson. Shop-fixtures, chiefly designed for grocers and corn-chandlers.—L. J. Crossley, R. Hanson, and J. J. Hicks. Water gauges.—D. A. Fyfe and W. H. Bowers. Recovery of alkali from the liquid in which esparto, wood, straw, or other material has been boiled.—H. L. Smith. Railway crossings.—C. Wright. Picking sticks employed in looms for weaving, and apparatus employed therein.—C. Wright. Shuttles employed in looms for weaving, and machinery or apparatus employed therefor, and other purposes.—J. Imray. Apparatus for assorting nails (com.).—C. H. Roeckner. Apparatus or machinery for the treatment of fibre and manufacture of pulp, and the recovery of chemicals used.—J. Kaye. Apparatus employed for collecting fares, checks, or tickets on public conveyances, and other places.—J. Boyd and T. A. Boyd. Machinery for winding yarn or thread.—A. M. Clark. Permanent way of railways (com.).—J. Parkinson, H. Morgan, and P. Eadington. Appliances for rendering lever weighing machines automatic or self registering.—E. A. Jones and J. A. Jones. Rotary puddling furnaces.—J. H. Johnson. Artificial palates (com.).—J. T. Griffin. Additions to reaping and mowing machines (com.).—E. Naylor. Chaff-cutting machines.—W. H. Dugard. Steam engine valves.—W. Shanks. Apparatus for drawing off wine, beer, and other liquids from casks or other vessels, and transferring such liquids to bottles or other receivers.—A. V. Newton. Sewing machines for stitching button holes and for other purposes, and the stitch produced thereby (com.).—B. Walker and J. F. A. Pfau. Pumping and air compressing engines.

On December 2nd.—4130 to 4145.—J. Pilling. Sizing and preparing yarn and apparatus employed therein.—G. Lowry. Machinery for beetling fabrics or fibrous substances, for driving piles, and for stamping, boring, crushing, and hammering animal, vegetable, and mineral substances.—W. F. Lotz. Petroleum heating and cooking stoves.—T. Pridham. Apparatus for drying tea and other substances.—M. H. Simpson. Springs for carriages and for other purposes (com.).—T. Longworth and F. L. Jones. Looms for weaving.—J. G. Rollins. Portable forges (com.).—C. Reuter. Apparatus for stamping paper collars and other articles.—H. Wedekind, H. Chamberlain, and J. Craven. Kilns or ovens for burning bricks and other like substances (com.).—J. A. Turner. Machine for darning stockings and other similar articles, also cloths and other materials.—S. Holness. Means of indicating the names of streets or other places, or of indicating words or numbers or devices on street or other lamps, applicable also for indicating the like generally on glass or other surfaces.—S. M. Yeates. Telegraphic apparatus, partly applicable to other purposes.—J. L. Plimpton. Skates.—E. Wolff and L. Wolff. Pencil cases or holders.—T. Hale. Preserving wooden posts when fixed in the ground.—M. H. Simpson. Transmitting and multiplying rotary motion (com.).

On December 3rd.—4146 to 4162.—D. McDonald and J. McDonald. Mechanism for preparing orange peel for marmalade.—J. Greig and C. Spinks. Mills or apparatus for grinding or reducing grain, seeds, or other granular substances.—W. Leech. Signal apparatus for collieries and other similar purposes.—J. B. Hamilton, G. E. Wade, and R. W. O. Voysey. Organs.—A. Ford. Cleaning cotton waste and utilizing the fluids employed therein.—J. M.

Plessner. Apparatus for distributing or spraying scents and liquids generally.—M. Benson. Apparatus for cooling, refrigerating, and making ice (com.).—B. Hunt. Means of clarifying cane-juice, the same being also applicable to the production of bi-sulphite of lime or other combination of sulphurous gas or carbonic acid gas or other gas with an alkali (com.).—J. W. Wattles. Suspenders for pantaloons or trousers. (Complete specification.)—W. H. W. Campbell. Drawing implement forming a rule, square, triangle, scale, and protractor (com.).—A. V. Newton. Ribbon looms (com.).—J. Byrd. Looms.—R. Goodall. Clarifying impure water or sewage, and preparing the precipitate or sludge for re-use.—J. H. Small. Hair brushing, combing, and clipping machine, chiefly designed for cleaning horses and other animals, parts applicable to other machinery.—W. Loftin, W. Koolman, and A. J. Iger. Curved electrotype printing plates.—J. A. Huggett. Horse nails.—A. M. Clark. Musical instrument known as the pyrophone.

On December 4th.—4163 to 4180.—J. A. Longridge. Axle-boxes for locomotives and other railway vehicles.—J. Davison. Apparatus for removing dead centres in crank shafts, especially applicable to hand pumps.—D. Prichard and W. Jackson. Break for vehicles.—W. Morgan-Brown. Breech-loading cannon (com.).—J. Burnett. Machinery or apparatus for removing the whip of lappet cloth or from fabrics.—A. Lacordaire. Method of and apparatus for condensing steam or vapour, and applying to useful purposes the liquid of condensation and the condensing medium by which heat has been absorbed or taken up (com.).—J. Dickie. Window guards.—J. A. A. Buchholz. Treating grain and seeds for decorticating and polishing purposes, and mills or apparatus therefor.—W. R. Lake. Couplings for railway engines and carriages, and apparatus for adjusting the same (com.).—C. M. T. Du Motay. Mode of preparing or treating silk.—A. Stewart. Illuminating apparatus for use in dental and surgical operations.—R. Horasby, J. E. Phillips, J. Innocent, and G. T. Rutter. Reaping and mowing machines.—L. Mond. Carbonates of soda.—W. H. R. Wise. Manufacture of artificial manures. J. S. Russell. Means for the more effectual, economical, and convenient generation, storing, and application of heat and mechanical power.—A. Kitson. Raising or lowering apparatus.—C. Hoyle, W. Shackleton, and W. Preston. Washing machines.—W. Bruce. Method of and means and apparatus for fining, aerating, bottling, and preserving ale, porter, and like fermented beverages.

On December 5th.—4181 to 4194.—T. K. Hill. Safety valves for steam generators.—F. J. Money. Construction of hot-air baths.—W. P. Stone, M.D. Preparation of food.—R. Hadfield. Wheels for tramway carriages.—J. Comery. Machinery for the manufacture of cut nails and tacks.—J. Cullen. Safety fittings for steam boilers to prevent their explosion or the injurious effects therefor.—J. Smith. Shuttles employed in looms for weaving.—T. Morgan. Furnaces of steam boilers, especially adapted for burning straw and such like fuel (com.).—P. W. Willans. Hydraulic engines and pumps.—W. R. Lake. Apparatus for compressing air (com.).—W. R. Lake. Manufacture, consisting in the conversion of certain products of the plant *Ketmie* or *Syrian Mallow* into paper pulp and alcohol (com.).—F. Wirth. Syringes (com.).—T. Nash. Tube brushes, applicable in part to other brushes.—G. H. Smith and H. C. Paterson. Treatment of hydrocarbons in combination with other substances, and the manufacture of a hard material therefrom.

On December 7th.—4195 to 4207.—J. C. Sellars. Artificial stone.—P. Nolet. Double-acting atmospheric engine. (Complete specification.)—F. Bayart and H. Bayart. Looms for weaving tight cloths.—E. Conyers and J. Pulkwin. Means or method employed for depilating hides or skins, and apparatus employed therefor.—J. H. Le Moyné. Loom shuttles. (Complete specification.)—J. H. Johnson. Carburettors (com.).—W. H. Thompson and N. G. Kimberley. Indicating and recording apparatus for steering purposes.—S. Smily. Method of stamping or pressing designs on metal and the dies for that purpose.—J. Faulkner. Tramways.—W. H. W. Campbell. Drawing compass (com.).—H. Lomax. Sewing machines.—H. A. Bonneville. Combustible coal bricks, and machinery for compressing and solidifying

the same (com.).—J. Smith. Machinery for spinning and doubling.

On December 8th.—4208 to 4224.—S. Osborn. Knives for reaping and mowing machines.—R. C. Brooks and A. J. Van Winkle. Process for the distillation of alcoholic spirits, by which alcohol free from fusel oil is produced by a single distillation, also including an improved distilling apparatus adapted therefor, and an improved method of reducing the proof of spirits in order to produce whisky. (Complete specification.)—W. B. Haigh. Circular saw benches and wood cutting machines worked by hand or steam power.—M. Davenport. Fastenings for doors, especially those of railway carriages and other vehicles.—J. Wolstenholme and C. Thorpe. Steam pumps and pumping engines.—G. Ashworth and E. Ashworth. Steam pumps and pumping engines.—R. Wright. Castors.—J. Ireland. Distillation of carbonaceous materials and the production of charcoal and coke, and in apparatus for that purpose.—J. H. Johnson. Machinery or apparatus for trimming or ornamenting fabrics and articles of dress (com.).—W. R. Lake. Formation of the bore or interior of gun-barrels (com.).—S. Regan. Land and marine boilers and their furnaces, and furnaces used for the manufacture of iron and other purposes.—W. Jones and H. N. Box. Reversible heel for boots and shoes.—W. Stevenson. Wood strips or laths in combination with wire cord or other flexible material in the production or manufacture of portable-lattice or trellis work.—A. M. Clark. Steam condensers (com.). (Complete specification.)—J. Thomas, E. S. Morris, and F. E. Abel. Apparatus for cleaning tin plates,terne plates, and other metal-coated plates.—J. G. Tongue. Couplings for shafts, rods, and other articles (com.).—I. C. Colton. Construction of governors or regulators for steam and other motive-power engines (com.).

On December 9th.—4225 to 4246.—H. P. Garland and A. J. Gove. Sewing machines for stitching sacks, bags, carpets, and for other like purposes. (Complete specification.)—A. J. Gove. Sewing machines for hemming sacks or bags, and other fabrics. Complete specification.—W. T. Sugg. Gas burners applicable to other gas fittings, and method of constructing and manufacturing the same.—J. A. Muller. Apparatus for measuring water or other liquids, applicable also as a current meter and moter.—R. Wilkinson. Coupling railway carriages and trucks.—W. R. Lake. Apparatus for protecting buildings against fire, and for ventilating them and supplying them with steam for various purposes, also applicable to the protection and ventilation of ships (com.).—G. Haseltine. Governors for steam engines (com.). (Complete specification.)—A. Inghels. Shelter for preserving people from the sun's rays.—G. Haseltine. Machinery for casting, pressing, and condensing metal (com.). (Complete specification.)—E. Foster. Taps and valves.—J. Prestwich and J. Pimbley. Economizers for heating the feed-water of steam boilers.—J. Thom. Ageing printed fabrics and apparatus connected therewith.—J. J. Royle. Apparatus for discharging air and water of condensation from vessels containing steam, also applicable in the construction of a steam reducing or diminishing valve, and for automatically controlling the dampers of steam-boiler furnaces.—P. D. Roberts. Studs and other similar fastenings.—J. H. Weston. Apparatus to be connected with open gas-burners for supporting half-globes or reflectors, and for increasing the reflective property of the flame.—J. Tenwick. Reaping and mowing machines.—H. Bland. Sewing machines and accessories thereto.—L. Sterne. Railway couplings (partly com.).—E. Philippe and H. Pinet. Casks and machinery employed therein.—A. V. Newton. Manufacture of metal tubing and hollow shafting and axles (com.).—A. T. Lawson. Machinery for preparing and spinning flax, hemp, jute, and other fibrous substances.—J. W. Read. Apparatus for gumming labels.

On December 10th.—4247 to 4265.—J. C. Morrell. Construction of sewer pipes, drain pipes, and modes of treating sewage.—F. Shippbottom and T. Battersby. Skewers and creel frames used in machinery for preparing and spinning cotton and other fibrous materials.—R. W. M. Fyne. Umbrellas and parasols.—J. Aslin and R. Warner. Brooch fastener.—J. Cave. Apparatus for obtaining light and heat.

(Continued on page 45).

Scientific and Literary Review.

MARCH 1, 1875.

ECLIPSE OF PATENT REFORM.

THE LORD CHANCELLOR'S NEW BILL.

We last month uttered a prophecy as to what the Lord Chancellor would propose to the House of Lords professedly as a measure of amendment of the Patent Law, and we have now to place before our readers the substance of the measure laid on the table of that House, which in all its objectionable details more than fulfils our vaticinations. The * denotes points demanding attention.

The Bill, after the usual preliminaries as to (1) Short title, (2) fixing the Commencement of Act as 31st December, 1875, and repealing (3) the enactments in schedule, with the addition (4) of an interpretation clause, proceeds to authorise the appointment (5) of a Commission of Patents, consisting of the same legal officials at present constituting the Commission, who are to act in conjunction with *five* other persons appointed by Her Majesty, from time to time, by warrant under Her Royal Sign Manual, on the recommendation, as regards *two*, of the Lord Chancellor, and, as regards the others, of the Board of Trade, to be commissioners during Her Majesty's pleasure;

Also (6) *Examiners*, namely, *two* or more, not exceeding *four*, as the Lord Chancellor, with the consent of the Treasury, from time to time directs, who are to be specially qualified for the office by legal or scientific knowledge;

Also (7) *Referees* for Patents, who are to be persons specially qualified for the duty by knowledge of manufactures, arts, or science, that is to say:—A list of referees is to be made by the Commissioners, with the concurrence of the Board of Trade, as soon as may be after the passing of this Act, and thereafter at the end of every successive period of *two* years. The referees to be distributed in panels, according to their several qualifications.

The Bill next provides (8) that an *application for patent* shall be made by the applicant filing at the Patent Office the prescribed form of application and declaration, and a specification, particularly describing and ascertaining the nature of the invention and in what manner it is to be performed, and that notice of the application be published; also that any person having an interest in opposing the grant may file notice of opposition, with particulars of his objections;

And (9) that the use and publication of the invention by the applicant, during a period of *six months* from the date of the application, shall not prejudice the grant of a patent for it (which protection from the consequences of use and publication is in this Act referred to as provisional protection);

Also (10). *Reference to examiners and referee or referees*. Such examiner and referee or referees to be nominated to act in each case according to a fixed rotation, which shall not be made public, or in the other mode prescribed (if any). Every referee before acting in a case to make a declaration to the effect that he has no interest in the application.

By Section 11, the examiner and referee or referees shall consider the application and relative documents, and shall report to the Commissioners thereon, and especially with reference to the following questions:—(a.) Whether the invention is a proper subject for a patent within the Statute of Monopolies; (b.) Whether the specification is sufficient; (c.) Whether the invention is new, as far as they can judge thereof from an examination of former specifications and other documents and publications in the Patent Office; (d.)* Whether the invention is in the nature, wholly or mainly, of a combination of known machinery, substances, or processes; (e.) Whether, regard being had to the last-mentioned consideration, or to the consideration that the invention is not of greater importance or utility, or for any other reason, it is expedient that the duration of the patent to be granted for it (if any) be limited to *seven* years; or (f.) Whether, by reason of the *frivolous character* of the invention, or for any other reason, it is not worthy of a patent.*

Reference (12) to the *Law Officer* is provided for, who is to report in favour or against same, and whether seven or fourteen years ought to be allowed.

The Commissioners shall hereupon make public the application and relative documents, report, and opinion.*

The report and opinion shall be annexed to, and shall always go with, the specification.

Notice to proceed can then (13) be given in due course.

And (14), the warrant can be prepared and the patent sealed,

or if the Law Officer has reported adversely, the applicant may petition the Lord Chancellor for grant and sealing of patent.

Any person (15) may petition the Lord Chancellor against sealing patent; and,

(16.) A patent shall not be sealed unless a request for the sealing thereof is made within *three months* from the date of the warrant, and within the period of provisional protection. [An absurd enactment copied from the Act of 1852.]*

Every patent shall be sealed within *seven days* before the expiration of the provisional protection, and *not sooner*.*

Every patent shall be dated the day of application.

(17.) Every patent shall be sealed with the Great Seal of the United Kingdom, and shall have effect throughout the United Kingdom, the Channel Islands, and the Isle of Man.

A patent may be made to extend to any of Her Majesty's colonies and plantations abroad, except one in which it would be invalid by the law in force therein for the time being; and a patent shall have effect as in the United Kingdom in every place to which it is so extended.

(18.) Notwithstanding anything in this Act, an applicant may obtain, on petition to the Lord Chancellor, such extension of time as the Lord Chancellor thinks fit in the cases, and to the extent following:—(1.) Extension of the period of provisional protection, so that it be not extended beyond *twelve months* in the whole from the date of the application; (2.) Extension of the time within which a request for sealing is to be made; (3.) Extension of the time within which the patent is to be sealed; and in every such case everything done or happening within the extended time shall be deemed to have been done or to have happened within the time originally allowed by this Act.

As to *foreign inventions* (19) (1) a patent shall not be granted on any application, unless the applicant declares himself to be the first and true inventor, and no patent shall be granted in respect of a communication from abroad; (2) a patent shall not be granted after the expiration of a foreign patent for the invention, and, if so granted, shall be void; (3) if at the time of the application there is a foreign patent for the invention in force, a patent shall not be granted unless the foreign patentee is the applicant, and his application is made within *six months* after the date of the foreign patent, or of the earliest foreign patent (if there are more than one); (4.)* A notice of every foreign patent for the invention existing at the date of the warrant for the patent shall appear by indorsement or otherwise on the patent; (5.) The patent shall cease on the cesser of the foreign patent (if any), or of such one of the foreign patents (if more than one) as first ceases. For the purposes of this section, any grant of privilege for the monopoly or exclusive use or exercise of an invention in a foreign country shall be deemed a foreign patent.

Use in foreign vessels in British waters (20) not to be an infringement, just as under existing laws.

Amendment of specification (21) is to be allowed, but where leave to amend is granted, care is to be taken that any amendment be not allowed if it would make the specification as amended substantially larger than or different from the specification as it stood before the amendment.* Amendment made at the request of applicant after examiner's and referees' report or by a patentee, to proceed like an original application.

Any amendment for which leave is given to be indicated on the specification; and,

An amendment shall not be admissible in evidence in a proceeding pending at the time of request for leave to amend, except a proceeding for revocation of the patent.

Where an amendment is allowed after the patent is sealed, no proceeding shall be taken in respect of an infringement committed before the amendment, unless leave to take the same is made part of the leave to amend.

Leave to amend shall (except in case of fraud) be conclusive as to the right of the party to amend.

A petition to Lord Chancellor for revocation instead of *scire facias* (22) is provided for.

Assignments and Licences, by Sections 23 to 26, are to be subjected to substantially the same rules as under the existing law.

A patent shall be liable (27) at any time after the expiration of *two years* from its date, to be revoked on either of the following grounds:—(a.) That the patentee fails to use or put in practice the invention, by himself or his licencees, to a reasonable extent, within the United Kingdom, or to make due efforts to secure the use or practice thereof there, proof of the contrary whereof shall lie on him; (b.) That it is made to appear to the Lord Chancellor that, in order to ensure a proper supply to the public, of articles produced under the patent, or proper means

for the use of the invention by the public, licences are necessary, and the patentee fails to grant licences to proper persons requesting the same, on terms which the Lord Chancellor, having regard to all the circumstances of the case, deems reasonable.

A prolongation of a *seven years' patent* (28) can be made by the Lord Chancellor.

The protection of inventions at exhibitions, in similar manner as under the present law, is provided for (Section 29).

Patent to first inventor not to be invalidated by application in fraud of him (30), and falsification of entries in register is (31) made a misdemeanour.

Penalty of £50 is given for unauthorised use of name of patentee, or mark of word "patent," similarly to existing law.

False declaration a misdemeanour (33).

The patent to bind Crown (34), but the officers or commissioners administering any department of the service of the Crown may use patent on terms to be agreed on between those officers or commissioners and the patentee, or, in default of such agreement, settled by the Treasury.

Law procedure (35 to 41) is to be pretty much the same as under the existing law. But by Section 42, on a petition, the Lord Chancellor, and in an action for infringement, the judge before whom it is tried, may, if he thinks fit, obtain the attendance and use the assistance of an expert (that is, of a person competent from his knowledge of manufactures, arts, or science, to advise and assist in the matter); and the remuneration of the expert shall be paid in the prescribed manner, and shall, as between the parties, be part of the costs of the proceedings.

Section 43 gives power for Lord Chancellor to make general orders as to legal procedure.

The commissioners, the Patent Office, the clerks, and official routine, are dealt with by Sections 44, 45, and 46.

By Section 47 the examiners are to perform in the Patent Office such duties in relation to the arranging, indexing, and abridging of specifications, and otherwise, as the commissioners direct.

The Commissioners are empowered to make general rules by Section 48. These rules are to refer to the form and contents of applications, specifications, declarations, notices, advertisements, caveats, objections, certificates, amendments, warrants, patents, duplicates, and other documents and instruments, and of copies and extracts, and the times and mode of the making, filing, depositing, leaving, recording, registering, giving, noting, certifying, issuing, preserving, publishing, and inspecting of, and otherwise proceeding on and dealing with, the same or any of them, and the printing, lithographing, or writing of the same, or any of them: the deposit of drawings and copies thereof, and of specifications, and of models,* in such cases as they think fit: the mode in which an examiner and a referee or referees shall be nominated in each case: the proceedings by and before the examiners and referees: regulating the opening to public inspection, and the printing, publishing, and selling, at such prices and in such manner as they think fit, of specifications, drawings, amendments, reports, and opinions: regulating the presentation of copies of their publications to public libraries and museums, literary and scientific bodies, and official authorities, in the United Kingdom, the colonies, and foreign countries: allowing an applicant or patentee to have not exceeding twenty-five printed copies of any specification or amendment filed by him without payment: securing and regulating the making, printing, publishing, and selling of indexes to, and abridgments of specifications and other documents in, the Patent Office: establishing, subject to the approval of the Treasury, and opening to public inspection a museum or collection of models of inventions, and other objects relating to patents

and to inventions: keeping and opening to public inspection a record-book of patents, wherein shall be entered notes of all grants of patents, specifications, amendments, prolongations, revocations, and expirations of patents, with the dates thereof, and other things affecting the validity of patents: regulating the entries in the register of assignments and licences: regulating, subject to the approval of the Treasury, the fees of referees and experts: and generally for regulating the business of the Patent Office, and all things by this Act placed under the direction or control of the commissioners. General rules may be made under this Section at any time after the passing of this Act, but not so as to take effect before the commencement of this Act.*

By 50, all powers of the commissioners may be exercised by any three or more of them, the Lord Chancellor or the Master of the Rolls being one.

Stamps are dealt with in Section 51 and 52.

Scotland has its legal system made available by Sections 53, 54, and 55 in similar manner as now practised; and Ireland is dealt with in Section 56 in same manner.

By 57 provision is made for saving for effect of repeal and for rights accrued, existing patents, pending applications, &c.

By 58, for the purposes of proceedings taken or continued after the commencement of this Act under any enactments repealed by this Act, the commissioners under this Act shall be deemed to be the same body as the commissioners under any of those enactments.

By Sections 59, 60, 61, provisions are made for saving the power of Lord Chancellor, reservation of power to Crown, and that nothing in this Act shall take away, abridge, or prejudicially affect the prerogative of the Crown in relation to the granting of any letters patent, or to the withholding of a grant thereof.

The first schedule repeals 5 and 6 Will. IV., c. 83 (10th September, 1835); 2 and 3 Vict., c. 67 (24th August, 1839); 7 and 8 Vict., c. 69 (6th August, 1844); 15 and 16 Vict., c. 83 (1st July, 1852); 16 and 17 Vict., c. 5 (21st February, 1853); 16 and 17 Vict., c. 115 (20th August, 1853); 22 Vict., c. 13 (8th April, 1859); 28 and 29 Vict., c. 3 (27th March, 1865); 33 and 34 Vict., c. 27 (14th July, 1870). Thus all prolongations beyond 14 years are swept away.

The second schedule designates the stamp duties:—(I.) Payable by applicant and patentee. (a.) Up to sealing. For application, £5; for certificate of record of notice to proceed, £5; for warrant, £5; for sealing, £5; total, £20. (b.) Further within three years after patent: For patent, £50. (c.) Further within seven years after patent: For patent, £100. (d.) Further for amendment: For certificate of request for leave to amend, £5. (II.) Payable by opponent: For certificate of record of notice of opposition, £2; for caveat against leave to amend, £2. (III.) Miscellaneous: For certificate of entry of assignment or licence, 5s.; for certificate of search or inspection, 1s.; for office copy of a document, for every seventy-two words, 2d.

* This abridged copy of the Bill has been prepared by Mr. F. W. Campin, barrister-at-law, the secretary of the Inventors' Institute.

PROGRESS IN PARLIAMENT OF THE LORD CHANCELLOR'S PATENT LAW BILL.

THIS Bill was read a second time in the House of Lords on Friday, 26th February, Lord Granville suggesting the reference to a select committee, and Lords Belper, Hatherley, and Somerset taking part in the discussion.

Rebichs.

THE ADVANTAGES OF THE SEPARATE SYSTEM OF DRAINAGE, &c.

"The Evils and Disadvantages of the Metropolitan System of Combined Drainage, &c.," a Proposed Method of Sewage Disposal for the Metropolis, &c. By EDWARD MONSON, Assoc. Inst. C.E., Consulting Engineer, Surveyor to the Acton Local Board, London, W., author of "The Sewage Difficulty Exploded." London: E. and F. N. Spon, 48, Charing Cross. New York: 446, Broome-street. 1875.

THIS, although a small pamphlet, is a large contribution to our sanitary literature, but we will let our author speak for himself. First, as to the separate system, the correct principles of town drainage were laid down by the General Board of Health many years since, but they were controverted by the Metropolitan Commissioners of Sewers, who, to a great extent, neutralized the good done by the General Board of Health; and the sewage difficulty, as it is called, has been in a great measure owing to the erroneous views of these Commissioners, whose example has been followed by other towns. The General Board of Health advocated the separate system, and the removal of excreta by suspension in water. The Metropolitan Commissioners of Sewers, on the other hand, advocated the combined system. The former recommended the use of small glazed earthenware pipes for sewers, the latter recommended large brick sewers; the one recommended that the sewer be laid at the back of the houses, so as to avoid the presence of sewage gas within dwellings; the other laid their sewers under the streets in front of the houses, and beneath each house they carried a long drain from back to front. Up to the present time we have made no advance on the principles of drainage laid down by the General Board of Health.

Pipe sewers possess the following advantages: they are self-cleansing and free from deposit; they are comparatively free from sewage gas, and as the sewage gas, if formed, can be readily flushed out, they are conducive to health; they are comparatively free from vermin, for in them rats have no convenience for lodgment; they can be examined at the manholes equally well with brick sewers, and cleaned out with rods, if required; but they require a sufficient supply of water; and flannels, scrubbing-brushes, &c., should be kept out.

Brick sewers, on the other hand, unless there is a considerable flow of water, are apt to fill up; they then act as gas generators and gas holders, from which the gas cannot be conveniently expelled; for this reason they have been called elongated cess-pools and sewers of deposit: they harbour rats. But brick sewers can be examined by means of side entrances and manholes, and men can pass along them and remove any deposit or obstructions without breaking up the streets. This is certainly an advantage, but obstructions ought not to happen, and in a properly constructed system of drainage rarely do happen.

The object of town drainage is to remove excreta and the water which has been used for domestic and manufacturing purposes. There is a very important difference between the sewerage of a town and the drainage of a farm, for sewage is water polluted, and contains matter which is so noxious and offensive that covered sewers are necessary for its conveyance, whilst water from land drainage, on the contrary, is clear and fit for use, and being beneficial, wholesome, and pleasant, it is desirable that it should be kept above ground; but this difference is not always kept in view.

It is now pretty well understood that all sewage must be purified before it is turned into rivers and streams. And since the cost

of purification will depend upon the quantity of the sewage, it is of the utmost importance that it should be kept in the smallest possible compass consistent with efficiency, and that all land drainage, springs, &c., should be excluded from the sewers. This is called the separate system of drainage, and it is specially applicable to villages, country towns, and to large towns situate on the side of a hill, with open spaces and agricultural land beyond.

Some persons run away with the idea that this system is very costly, but this is a great mistake. There are others who think that efficiency can only be secured by large and costly works, and this also is an error, for in a properly devised scheme the works are not necessarily large or expensive.

The following modification of the separate system of drainage was designed and carried out by the author in 1863 and 1864, at Halstead, in the county of Essex:—

The plan of the works is that of "pipe drainage on the separate system, and back drainage," the sewers being coterminous with the water supply, sluice valves being placed at the ends of the water mains, and the whole of the system of sewers being flushed by the discharge of water for cleansing the water mains, or from Painter's Pond. Not aiming at entire separation, the rainfall, streams, and surface water were kept entirely free from sewage, and discharged into the mill-head: the house drainage or sewage was conveyed in pipe drains to a point beyond the town, to be afterwards dealt with. As the rainfall upon houses and yards is beneficial for flushing, one drain was considered sufficient for each house, and the rainfall in that case was not kept separate from the sewage; but care was taken to exclude from these sewers, as far as possible, all water that was not required for cleansing or for conveying the solids. The separation, in this case, consisted in keeping the surface water and streams quite free from sewage; and this is a practical exemplification of the separate system as set forth in this paper. The author considers that the mistake hitherto made has been the attempt to keep sewage free from rainfall—a thing which is impossible. Let us be content if we can keep rainfall free from sewage.

Halstead is situate upon two hills, which are separated by the river Colne. It is an agricultural town, but there is a craze manufactory, which employs upwards of 1,500 hands. A small quantity of velvet is woven in the town, and a great number of women and children are employed in straw-plaiting. The river is headed up, and drives part of the machinery in Messrs. Courtauld's craze factory, and a flour-mill higher up. Previously to the system of drainage being carried out the sewage was discharged into the mill-head in the centre of the town, the watercourses were polluted to a considerable extent, and there was a nuisance for want of drainage at almost every house.

There were good plans of the town, but there was no reliable information about the existing sewers, the lines of which were very irregular. To obtain this information the ground was opened at various places, and the sewers being found, the levels were taken, the sizes measured, and their position marked upon the map. Trial sections were then made, and, lastly, permanent sections in the usual way.

The pamphlet also treats of Surface-water Drainage, Back Drainage and Sewage Drains, Sewage Gas and the Ventilation of Sewers, and Utilization and Disposal of Sewage; after which the author treats of the Combined System of Drainage, which he says he uses to convey the idea of having one set of sewers for all purposes, constructed to receive not only the sewage but the land drainage and storm-water as well. The term is used as the opposite of the separate system, just described; and it is

not meant to convey the idea of combining several towns together for the purpose of drainage. But we have said enough to indicate the value of the work, and must refer our readers to the work itself for a definite and complete knowledge of it.

ELEMENTARY SCIENCE.

"Science Primers for Elementary Schools.—Astronomy." By J. NORMAN LOCKYER. Macmillan and Co.

"Elements of Magnetism and Electricity." By JOHN ANGELL. Collins, Sons, and Co.

"A Manual of Telegraphic Construction: Mechanical Elements of Electric Telegraph Engineering." By JOHN CHRISTIE DOUGLAS. Griffin and Co.

THE first of these works needs no commendation of ours; its author's name is sufficient. We may, however, add that it is fully equal to what might be expected from Mr. Lockyer. As to the second work, Mr. Angell's, it is one intended to accomplish a most difficult task, namely, to help forward the earnest student who wishes to advance in real knowledge, and also to serve the purposes of those who are cramming for the Government science examinations. We think Mr. Angell has succeeded. The work of Mr. Douglas relates, not to electricity and its application to telegraphic instruments, as to which many valuable works already exist, but to telegraph construction, maintenance, operation, and organization; and his book will be found useful to electric-telegraph engineers.

"Footpath Poems." Translated and Original. By GEORGE BROWNING, Second Edition. London: John Camden Hotten, Piccadilly.

OF all poetry there is none richer in bright thoughts and fancies, though lacking the grandeur of English poetry, than the German. Of the many translators who have appreciated its beauties, we would mention Carille, Dean Alford, Lord Lytton, Lord Ellesmere, Shelley, and Longfellow.

The beauty of German poetry can alone be conceived in the original, but we are pleased to meet with such a translator as Mr. Browning, who with the soul and sympathy of a poet gives us a few such charming songs as these. We here meet with the majority of the known German poets, Goethe's much admired, "Erl King," Sturm's "By the Window," Schiller's "Monologue from Joan of Arc," and several of Heine. Of these, "The Sea hath its Pearls," or as Mr. Browning has it, "Pearls hath the Ocean," is undoubtedly the best. This is a favourite of Longfellow, but we prefer Mr. Browning's translation, which is the following:—

"Pearls hath the ocean,
Stars hath the sky,
In my heart, in my heart,
Here love have I.

"Grand are the sky and the sea,
But my heart is grander far,
For my love beams fairer, brighter
Than any pearl or star.

"Thou little youthful maiden,
Come to my giant heart,
My heart, and the sea, and the sky,
With love are rent apart."

The second part of this little volume is filled with a few happily conceived original poems. We observe Mr. Browning's correct idea of rhyme and rhythm, which is shown especially in this part of the volume; though not the great proof of a poet, for *Poeta nascitur, non fit*, is at least all important in enabling a poet to properly educate his inspiration to express himself in political pictures.

We wish all poets could turn a sonnet as prettily as Mr. Browning, of which the following is an example. The sonnet is undoubtedly the most complete form of poetry. Shakespeare was aware of this,

but failed to achieve it, preferring the English to the Italian model.

IN MEMORIAM.

"Farewell, sweet spirit! we may meet again,
Tho' now a mighty gulf betwixt us lies—
My loss is great—to thee is great the gain,
For thy dear soul doth rest in Paradise.
I long to reach that land beyond the skies,
Where Peace, and Truth, and Love for ever reign.

Now thither thou art borne, my love, I fain
Would learn with thee the heavenly mysteries.
Heaven wills it not! My sorrows I must bear,
Tho' grief hath well-nigh burst my stricken heart,

Tho' there is now no bosom that can care
To listen to my woes, and bear a part,
Yet doth thy simple memory seem to be
A soul-beacon to all eternity!"

In a sonnet on "Evening" we meet with the following line:—

"Till shades of evening wander into night."

This is very beautiful. To watch this is what a poet alone can appreciate in its ideal sense; imagination and fancy, sympathy with nature, and a passion for the beautiful are the chief characteristics of the true poet.

On page 96 we note a line:—

"Not e'en Time's effacing finger."

We think we have read something like this in Byron. A love for his writings would alone redeem an author from plagiarism, and we have no doubt it is the case in this instance.

There is much in this volume well worthy the notice of all lovers of poetry. We congratulate Mr. Browning on its publication, and hope in some future day to meet with some further efforts of his genius.

REVIEWS POSTPONED.—From pressure of other important matter, various reviews of books received must be left over till next month.

LITERARY ANNOUNCEMENTS.

The Autotype Company are preparing, in view of the approaching Geographical and Ethnological Congress in Paris, a series of portraits illustrative of the different types of native races in Polynesia, from photographs taken under the direction of Mr. C. F. Wood, of University College, Oxford (a nephew, we believe, of Mr. Gathorne Hardy). Mr. Wood, who recently spent a year or two in Fiji and the South Seas, has compiled some notes of his journeys, which are shortly to be published.

One of the most striking features of the publishing trade at the present time, says the *Athenæum*, is the quantity of school-books that pour from the press. Every firm at one time seemed bent on having its own magazine; and now each has its series of school-books; some, indeed, several sets. A new series, to be called the London Series of English Classics, is about to appear, under the direction of Mr. G. W. Forrest, Head Master of the High School, Surat, and Mr. J. W. Hales; the publishers being Messrs. Longmans and Co. Amongst the editors with whom arrangements have already been made are Prof. Henry Morley, Prof. Ten Brink, Prof. Dowden, Mr. Thomas Arnold, Dr. Abbott, Mr. Furnivall, Dr. Morris, Mr. E. E. Morris, Mr. Jerram, Prof. Wagner, of Hamburg, Mr. Fitch, &c. Prof. Morley will edit a play of Ben Jonson's; Prof. Ten Brink, a selection from Chaucer; Mr. Hales, Milton's "Samson Agonistes" and also "Cymbeline;" Dr. Abbott, Bacon's Essays; Mr. Forrest, Macaulay's Essays on Clive and Warren Hastings, &c. As a rule—but there may and will be exceptions—the series will include works not at present undertaken by the Clarendon Press; and generally, it does not propose to attempt again what has once been really well done. We also hear of a series of Latin and Greek school-books, to be edited by Prof. Wilkins, of Owens College, Manchester, and Mr. Reid, of Christ's College, Cambridge. Messrs. Collins also promise a somewhat similar series, to be superintended by Dr. L. Schmitz,

Correspondence.

FRAZER AND DEWAR ON CREATION.
To the Editor of the SCIENTIFIC AND LITERARY REVIEW.

SIR,—I have had an opportunity of obtaining a perusal of this extraordinary production, to which attention has been directed by the review which appeared in your last issue, and also by the fact of the book being, apparently, published under the auspices of a firm of high standing. Written with some amount of literary ability, and with a plausibility which would utterly mystify persons ignorant of every branch of accurate knowledge, the work, in its quasi scientific aspect, suggests the idea of a stupendous joke.

It would be difficult to describe the feelings of amazement and amusement, not un-mixed with suspicious apprehension, with which this treatise "On Creation" has been perused by persons having some acquaintance with exact science. Copious quotations, in addition to those given by your reviewer, could alone do effective justice to the work. The grand discovery of the authors, *Atomagnetism*, is stated to be a combination of two "laws," of which it need only be stated that one, the atomic attraction of like for like, is universally false, whilst the other, the attraction of opposite magnetic poles, is true only under certain conditions. It was Faraday's misfortune," say the authors, "that he was born too soon; before the law of atomagnetism was discovered." Can it be credited that these philosophers attribute the production of rain and dew to the combination in the atmosphere "of the two classes of matter in the form of gases," mentioning, at the same time, *en passant*, that other philosophers "tell us" that water is composed of oxygen and hydrogen, eight parts of oxygen to one of hydrogen; and that most powerful combustion is produced by a combination of the same gases "in different proportions?" A drop of rain, too, becomes enlarged as it falls through a moist atmosphere, not from any condensation of aqueous vapour, but because "the hydrogen in the drop combines with the oxygen it comes in contact with." Water forms in a similar manner on the outside of a decanter containing ice, "not by reason of the temperature, but by the ice sending forth mineral gas, which, combining with the oxygen (or animal and vegetable gas in the room) forms water." How pretty it must be to see a drop of water "enlargening" under the flame of the oxyhydrogen blowpipe!

"Atomagnetism," say the authors, "explains all difficulties connected with the subject of life;" and it also explains the melting of a poker in a fire made hot enough. "Why? Because the polarity of the atoms of the iron are (*sic*) reversed, and the mineral atoms of the fire have a greater attraction for the atoms in the poker than the iron has." Would the reader like to know exactly the property possessed by a magnet? The authors are equal to the task of giving the required information. "Dr. Thos. Thomson, in his treatise on 'Heat and Electricity,' says:—'Electricity is the property acquired by bodies of attracting and repelling light bodies through the action of friction on them.' This is exactly the property possessed by a magnet. Why should two names be given to the same thing?" Why, indeed! "Of course," say the authors, "if the scientific world chose to reverse the names, and call magnetism electricity, and *vice versa*, it would be all right. But this is not done. A magnet by them is called a magnet, and its force is called magnetism. This force is exactly similar to the force in a telegraph line, and yet they call the latter electricity. This is what we object to, and wherein we desire to correct public opinion."

"Cold," we are informed, "is caused by hydrogen or mineral gas, being a property of it. The shark and the dog fish have but little or no gills, neither has the lobster;" but the whale (a mammal) is "provided with extensive gills."

But now, after having extracted just a little of the fun to be derived from the work, I have to suggest a somewhat serious question. Leaving out of account for the moment the amount of mental harm that may possibly be effected in the case of undeveloped or debilitated intellects, I would ask, What can be the ultimate object and purpose of the treatise? The authors are evidently well aware of the necessary antagonism between themselves and everything that is accepted and respected in science, and for my part I regard its object—and the only direction in which I can conceive it could be made profitable to any one—as being perhaps indicated by the statement in the preface that "magnetism will, long before the present century closes, entirely replace steam as a motive power," and by the chapter on "Medicine, or the life action of the body, and the cause and cure of disease." For until elementary scientific knowledge becomes popularised to a far greater extent than it is at present, there will always be a wide sphere of action, whether in invention or medicine, for those who promulgate new ideas, however fanciful they may be.—I am, sir, yours very truly,
DESMOND G. FITZ-GERALD, M.S.Tel.E.

To the Editor of the SCIENTIFIC AND LITERARY REVIEW.

SIR,—I have just now been reading the *Times* with Lord Cairns's address on the Patent Law Amendment. I think that we inventors ought to sign a petition to Lord Granville with certain amendments in the same Bill. Firstly, instead of provisional protection being for only six months, let the same be for twelve months. This would be of great importance, and instead of the invention being kept from the public, let it be made known. Will you be kind enough to acknowledge the receipt of my letter by return, as my plan would be making the first payment cheaper.—Yours truly,
H. E. HUTCHING.

ON THE GEOLOGICAL ORIGIN OF THE CHESIL BANK AND BEACHES OF DORSET AND DEVON.

BY PROFESSOR JOSEPH PRESTWICH, M.A., F.R.S., V.P.G.S., ASSOC. INST. C.E.

THIS was a paper read at the Ordinary Meeting of the Institution of Civil Engineers, held on Tuesday evening, the 2nd of February. It is, in substance, as follows:—

This remarkable bank of pebbles, extending from Portland to Abbotsbury, a distance of nearly 11 miles, was described with great accuracy by Sir John Coode, M. Inst. C.E., in 1853 (*Minutes of Proceedings Inst. C.E.*, vol. xii., page 520). It was then 43 feet high and 600 feet wide at the south end, decreasing to 23 feet high and 510 feet wide at the north end. The pebbles diminished in size from Portland to Abbotsbury. Sir John Coode also stated that the shingle consisted chiefly of pebbles of chalk-flint, with a small proportion of others of red sandstone, porphyry, and jasper, none of which could have been derived from local rocks. In order to determine their origin, he examined the coast from Portland to Start Point, and traced the flints to the chalk cliffs between Axmouth and Lyme, and the red sandstone, porphyry, and jasper pebbles to the New Red Sandstone of Budleigh Salterton, and other places in Devonshire; whence he concluded that the only source from which the shingle of the Chesil Bank could have been derived was between Lyme Regis and Budleigh, and that it was propelled eastward along the coast to the Chesil Bank by the action of wind-waves, due to the prevalent and

heaviest seas. The objection to this view urged at the time by the Astronomer Royal was, that the largest shingle occurred at the Portland end of the beach, or the most distant part from which it had travelled.

More recently an old "raised beach," standing from 21 feet to 47 feet above the present beach, had been discovered on the Bill of Portland, and Professor Prestwich showed that this beach contained all the materials found in the Chesil Bank, including also numerous chert pebbles from the Upper Greensand of the cliff between Bridport and Sidmouth. This raised beach was not due to any existing agency, but to causes in operation at a geological period so remote as the end of the glacial period, and before the land had assumed its present position and shape. Remnants of this beach could be traced in or on the present cliffs, at intervals, from Brighton to the coast of Cornwall, being more numerous in Devon and Cornwall, as the rocks were harder, than among the softer strata of Dorset and Hants, where, with few exceptions, the old line of cliff had been worn back and deeper bays formed. The travel of the shingle of this old beach was generally like that of the present beach from west to east.

The author considered that the action of the "Race" off Portland, and of the tidal waves during storms, combined to drive the shingle of the old beach at the Bill, and of that portion of it which must be spread on the sea-bed westward of Portland, on to the south end of the Chesil Bank, whence the shingle was driven northward to Abbotsbury and Burton, by the action of the wind-waves, having their maximum force from the S.S.W., a direction which he showed to be the mean of the prevalent winds. Here, these wind-waves became parallel with the coast, and the westward movement ceased about Bridport, beyond which point the shingle travelled in the opposite direction, viz., from west to east, or from the coast of Devon to that of Dorset; the quartzite pebbles from the conglomerate beds of Budleigh Salterton, which travelled from that part of the coast eastward to and beyond Sidmouth, gradually diminishing in numbers as they approached Lyme, very few, if any, reaching Bridport. This conclusion was in accordance with the facts: 1° That the pebbles of the Devonshire and Dorset strata, which formed the shingle of the "raised beach," constituted also the bulk of the Chesil Bank; 2° that there were also, in that bank, pebbles of the rocks and flint of Portland itself; 3° that the largest pebbles occurred at the Portland end of the bank, the pebbles decreasing gradually in size to Abbotsbury. The large dimensions of the bank he attributed to the great accumulative and small lateral action of the waves.

Professor Prestwich next discussed the questions connected with the shingle of the south coast generally, and showed that the greater part of it was derived indirectly from beds of quaternary gravel and debris, from the wreck of the "raised beach," and partly from the strata of the chalk and other cliffs, and not altogether or directly from the present cliffs. He noticed, also, the westward movement of the shingle from Lulworth towards Weymouth, owing to the interference of the Isle of Portland with the force of the S.S.W. wind-waves, and considered that none of the Devon and West Dorset shingle beach now passed the Bill of Portland, and that other such breaks might exist to the eastward whenever similar conditions were repeated. He explained the origin of the Fleet, like that of the Weymouth backwater, and of the Lodmore Marshes, by the growth of the Chesil Bank on the one hand, and of the Ringstead and Weymouth Beach on the other, gradually damming in portions of the old coast line. Those beaches themselves travelled on a line along which the opposing forces of the

wind-waves and tidal currents and the inertia of the mass to be moved were balanced. These views were stated to be in conformity with the theoretical opinion expressed on abstract grounds by the Astronomer Royal, and with the experience of practical persons residing on the spot.

The paper was illustrated by sections and diagrams, showing the position and range of the "raised beach" along the coasts of Dorset and Devonshire.

EROSION OF THE BORE IN HEAVY GUNS.

By C. W. LANCASTER, Assoc. Inst. C.E.

ONE of the greatest difficulties in the practical working of the muzzle-loading guns of the British service had been the rapid and injurious erosive action on the bore, due to the heated gases, generated by the ignition and explosion of the powder, finding vent on the upper side of the projectile, by the windage or difference of diameter between the calibre of the piece and the projectile, an allowance absolutely necessary to render muzzle-loading feasible. The magnitude of this evil was demonstrated by the fact, that the gun was disabled after a comparatively small number of rounds, and consequently had to be inverted, in order that what was previously the lowest part of the periphery of the bore should be turned uppermost, the eroded part assuming the lowest position; and subsequently, after the new portion had in its turn undergone erosion, the gun could only be rendered available for further service by being re-tubed, with a new A-tube of steel lining. From official returns relative to the endurance of eleven 10-inch 400-pounder 18 ton guns, it appeared that after having been fired a certain number of rounds, the whole of them were disabled, and required re-lining with new A-tubes. The average or mean effective endurance of ten of these guns was equivalent to firing 117 rounds per gun, viz., 65 with full charges, and 112 with battering charges. Discouraging as this state of things was, it did not represent the full extent of the evil; inasmuch as, long before the necessity arose for turning the gun, or relining it with a new steel tube, its shooting power and accuracy had been materially deteriorated by the erosion of the bore and the concomitant wearing away of the arrises of the grooves or angles of the rifling, which were the first parts attacked by the heated gas, and by the friction of the studs in centring the projectile, and in imparting the spin or rotation on its polar axis. The nature and extent of this prejudicial effect by erosion had excited the serious consideration of the British authorities. The remedial devices and appliances hitherto proposed had assumed, in the main, two distinct forms:—(1.) The coating of the projectile, wholly or partially, with a soft metal envelope, such as lead, which would, when subjected to the explosive action of the powder, be squeezed out, so as to fill the bore and take the rifling; and, (2.) The application of certain accessories, attached to, or separate from, the projectile, such as discs, gas-check rings, or wads of metal or other suitable material. Experience had demonstrated that, with muzzle-loading lead-coated projectiles, the powder must be limited to 1-10th the weight of the projectile. Since 1851, various devices, which were described in order of date of invention, had been tried, with more or less success, by the Author, Captain Blakely, Major Bolton, Major Lyon, the Elswick Ordnance Company, Major Maitland, and again by the Author, with the view of preventing the escape of gas over the projectile by metallic wads or other material. Trials at Shoeburyness in 1873 gave promising results, as was subsequently testified by Sir William Armstrong, C.B., M. Inst. C.E. Still, whatever appliances might be employed at the base of the projectile only, the head remained at a tangent to the axis

of the bore; not thoroughly concentric as in the breech-loader, though, by the plans proposed, it was thought this difficulty might be met.

But however efficacious these various contrivances might be, the primary and radical defects of grooved guns and studded projectiles would always remain. Accepting such ordnance as being for the present established in the British service, the Author had sought to provide the means of diminishing, as far as might be practicable, their attendant defects. All reasoning on the known premises led, however, to the inference, that the fundamental requirement was a simpler system of rifling the bore of the gun, whereby the smoothness and continuity of the interior surface might be preserved, while at the same time the necessary spin or rotary motion might be effectually imparted to the projectile. This, the author submitted, had been attained only by his own invention, known as the oval bore gun and projectile; and his belief was that, when fully developed and fairly tried, this system would completely satisfy and fulfil all the conditions of the problem, combining a perfect gas check and efficient centring with unsurpassed accuracy, high initial velocity, low trajectory, long range, and satisfactory powers of endurance. A careful examination and comparison of the official photographs sufficed to show that, from whatsoever cause, the erosive action of the powder on the oval bore was trifling; whereas, under precisely similar conditions, it entirely disabled the ordinary Woolwich rifled gun. If, then, the principle of muzzle-loaded projectiles, which had been persistently approved by the authorities in this country, was to hold its own, and if muzzle-loading guns were to retain their place as the equals of breech loading guns, the existing faculty and unmechanical system of rifling, with a grooved bore and studded projectiles, on which in the end the whole question turned, must be discarded in favour of a simpler and better system of rifling for gun and projectile, such as the oval bore, a conclusion which could be established on grounds both of economy and efficiency. (The Russian 11-inch Krupp breech-loading gun had been fired 800 rounds without material wear. The weight of the projectile was 481 lbs., and the charge 82½ lbs. of prismatic powder.) Paper read at the meeting of the Institution of Civil Engineers, 16th February, 1875.

CONSTRUCTION OF GASWORKS.

THIS paper, which was read at the Meeting of the Institution of Civil Engineers, on 12th January, by Mr. Harry E. Jones, Assoc. Inst. C.E., relates to the consideration of what types of gas-making appliances were cheapest in construction as well as most efficient in action. The site of gasworks should be selected chiefly for facilities in receiving and delivering material by rail or water, and every section, of which the most important was the retort house with its contents, should be so constructed as to admit of extension without involving destruction. Opinions were divided, whether the house was best with the retorts upon the ground level, or on a "stage." The author had come to the conclusion, that when there was a ready sale for coke from the ground-floor of the stage-house; as fast as it was made, a saving of labour, as compared with a ground-floor house, was effected; but not when the coke had to be stacked outside the house. A comparison of the manufacturing wages for the year 1873 of those Metropolitan Gas Companies employing stage-retort houses and others using ground-floor houses, showed a saving by the former of 48d. per 1,000 cubic feet of gas sold. On the other hand, the cost of a stage-retort house, complete with retorts and fittings, and having suitable coal stores, ranged from double to three times that of the simpler form of house for the same

capability of production. The cost of the stage-house was not less than from £16,000 to £18,000 per 1,000,000 cubic feet of gas produced per diem, or £8,000 more than the ground-floor house. This would require, at the usual rate of interest, £800 per year, to which must be added the wear and tear at £2 per cent. = £160, making an annual extra charge upon working of £960. Allowing a deduction for extra labour on coke, the net saving was probably about ¼d. per 1,000 cubic feet of gas. Supposing the maximum annual make to be 203,670,000 feet, the saving on this quantity would amount to £282, which fell short of the extra annual charge by £678. Of the various retorts, the round form was undoubtedly the strongest and most enduring, and the oval the weakest; but the latter and the D shape were capable of working heavier proportional charges. The greater the number of retorts within one oven, and worked by one furnace, the greater the economy in fuel; as the surface of the enclosing walls, and *pro tanto* the loss of heat by radiation, were thereby reduced in proportion to the capacity for carbonization.

The effect of the high temperature at which coal was best carbonized was that, through the dip pipes, the liquid contents of the hydraulic main were subjected to a continuous blast of gas from the white-hot sides of the retort. The stagnant tar, therefore, was boiled until its fluidity was gone. This produced pressure on the retort, causing loss through its pores, active deposition of carbon on its sides, and a constant choking of the ascension pipe, near the mouthpiece especially, but more or less throughout its length, occasionally even implicating the H pipe. There were many propositions to remedy these stoppages, and to do away with the hydraulic seal altogether. Of these, none would bear comparison for safety and effectiveness with the contrivance they aimed at displacing. The fault lay not in the hydraulic seal, but in the condition of its contents. The problem to be solved was how to keep the tar in the hydraulic main sufficiently fluid. The author found that an extra length of eight feet of ascension and dip pipe, interposed between the retort and the hydraulic main, reduced the average temperature within the latter 36°. The deposit of pitch then ceased, and no further stoppages were experienced. There was little prospect of the intermittent process of carbonizing by manual labour being superseded by a continuous system actuated by steam power. None of the suggestions with this aim had justified their adoption on a working scale. Even the modified advantage of substituting steam power for manual labour seemed difficult of realisation. Of this last, a thorough trial at Beckton had ended in its being for the present abandoned. The form of the condenser was immaterial so long as it was extensive enough, and did not separate the tar and liquor until the desired minimum temperature was reached. This should be near that of the atmosphere, even in the depth of winter, to avoid condensation of naphthaline and loss of illuminating power in distribution. Of exhausters, the best, known as "Beale's," has a rotary action. The washer and scrubber are next considered. These removed the ammonia, and such carbonic acid and sulphuretted hydrogen as would combine with the water and ammoniacal liquor used. Washers were generally shallow, oblong boxes, with cellular passages sealed by liquor or water, through which the gas was forced or drawn in fine streams; they gave a more intimate contact between the gas and the liquid than the scrubber, but were open to the objection that they caused back pressure. The scrubber, on the other hand, did not work well with small quantities of water, owing to the difficulty of ensuring equal distribution throughout its contents as commonly arranged.

The scrubber was usually a cylinder, sometimes of extreme height, filled with porous material, by means of which the gas was washed by ammoniacal liquor or by water; by these, and with reasonable care and entire exclusion of tar, fair results were obtained. The materials used in scrubbers were in themselves inert, and were subject to have their interstices filled by a deposit of tarry oil. The liquor was thus diverted, and established for itself distinct channels, the gas meanwhile taking separate routes through the mass of material, avoiding the contact desired. This defect was necessarily magnified in lofty scrubbers, where the liquid had to descend from 50 to 70 feet. For the removal of ammonia, and at the same time to procure liquor of great strength, the author preferred scrubbers on a principle somewhat like that of the Coffey still. They were boxes of iron 20 feet high, 10 feet long, and 2 feet wide internally, with longitudinal shelves of unwrought fir, 6 inches apart, extending alternately from one end of the box to within 6 inches of the other, so as to cause the water to traverse the whole length of one shelf before it descended to the next, meeting the gas flowing in a flat, wide current in the opposite direction. The washer or scrubber was an apparatus of great value, inasmuch as all purifying agents acted more energetically in a liquid form, and were chiefly and easily brought into contact with the gas without demanding manual labour.

The purifiers should be capable of holding such a bulk of material that its interstices might contain a considerable volume of gas, and reduce the velocity with which the latter were passed in contact with it. The capacity should vary with the density of the purifying material. With either lime or oxide of iron, there was a sacrifice of economy whenever the capacity of the purifiers, at any one time acting on the gas, was less than 4 cubic feet per 1,000 feet of gas purified per diem, and that so disposed that the aggregate depth of the material in lineal feet was not more than one-twentieth of the area in square feet. The author preferred to have on the outlet of each purifier to the clean gas main a valve sealed with fresh water. The great question of the day in purification was to remove the bisulphide of carbon. It had been ascertained that when sufficiently long in contact with an alkaline sulphide, this impurity was reacted upon. If, therefore, caustic alkali was submitted to gas foul with sulphuretted hydrogen, but free from carbonic acid, a sulphide was obtained, which reacted on the bisulphide of carbon. In this condition, however, lay the difficulty. Although alkaline bases had a higher affinity for carbonic acid than for sulphuretted hydrogen, and were therefore capable of removing it preparatory to the process before indicated, their affinity for the latter body was considerable, and it was not easy to prevent sulphuretted hydrogen being arrested, so as to vitiate the formation of sufficient alkaline sulphide in the succeeding purifier for the extraction of the bisulphide. From this cause results of an apparently eccentric and conflicting character were occasionally obtained. Absolute purity from bisulphide of carbon had not yet been attained, but so far this body appeared to be capable of restraint within unobjectionable limits.

Gasholders with their tanks were a portion of the plant which, next to retort houses, figured most prominently in a company's capital account, and therefore afforded the engineer scope for the exercise of economy in construction. The holders should be telescopic, developing a double storage capacity for the single expense in tank. The proportion of the height of the holder to its diameter should be regulated by the maximum amount of pressure required, subject to the value of the ground occupied. At the same time a height in each lift of

less than one-fifth of the diameter was undesirable. Gasholders might be light in weight without sacrifice to their efficiency. The iron sheeting need not be thicker than No. 12 Birmingham wire gauge, weighing 4·38lbs. per square foot. The pressure of the gas within assisted in maintaining their shape; and the sides needed little framing beyond good top and bottom rings, where the guide rollers were attached, and a sufficient number of uprights to sustain the weight of the top sheets. No truss framing was required, as the sheeting might rest on a cheap scaffolding of wood when the holder was landed, and would be sufficiently sustained by the gas within when afloat. The author had frequently been inside gasholders inflated with air, and had noticed the trussing hanging from the distended sheeting of the top, being practically a burden instead of a support. However perfectly a roof framing might be adjusted, when the holder was lifted by internal pressure, its members remained rigid while the sheeting stretched, and never again fitted the framing. At ordinary rates of iron, gasholders of the kind described could be constructed, for sizes below a capacity of 300,000 cubic feet, at about £13 per 1,000 cubic feet; above that size the cost diminished with the increase of capacity, until at 2,000,000 cubic feet £8 to £10 per 1,000 cubic feet represented the cost. A holder for 2,350,000 cubic feet, which had a slight truss in the top, had been executed in 1866 for the Commercial Gas Company at so low a rate as £5 13s. per 1,000 cubic feet. The external guide framing should be strong enough to sustain the inflated holder, even under the influence of a hurricane. At the same time, the constituent metal could be disposed in forms developing, far more than was commonly seen, the strength due to the weight of iron composing its members. The author had been impressed by the elegance, and general fitness of the form to the purpose, exhibited by the guide framings of the original gasholders at the Bow Common Station of the Chartered Gas Company, designed by Mr. Croll, Assoc. Inst. C.E. Gasholder tanks had usually, where soil permitted, been built of either brickwork or masonry, well puddled round the walls and over the bottom. Portland-cement concrete, in some cases without puddle, had been adopted latterly, notably by Mr. Livesey, M. Inst. C.E. Brick tanks, puddled, ordinarily cost £6 10s. per 1,000 cubic feet of capacity of the telescoped holder fitted in them, though the cost of the tank for the Commercial Company's holder was as low as £5 5s. per 1,000 cubic feet. A concrete tank constructed by Mr. Livesey had been completed at a saving of £2 11s. per 1,000 cubic feet as compared with a brick tank of the same capacity.

The governor or regulator, as usually constructed, had a conical valve suspended in the upward stream of gas, actuated by a balanced gasholder, and was open to the objection that, having a flat base to the cone, the latter was disturbed and acted upon by the current of gas, much as a loosely fitting piston would be, and therefore required constant readjusting. To obviate this irregularity, a large throttle valve had been adapted for the purpose, which worked admirably. The ordinary pressure upon the system of mains ranged from between 1·0 inch and 1·5 inch head of water between sunset and midnight to 0·6 inch or 0·8 inch for the rest of the twenty-four hours. To secure economical distribution, the regulation of the pressure in the mains at all parts of the system should be under complete control; that pressure should be, as far as possible, uniform with the initial pressure, or, under a constant rate of variation from it. These conditions were best fulfilled by distributing the gas from a mean level between the extremes, having high and low pressure mains for supplying the lower and higher portions of the district, right and

left, avoiding all duplication in their course, and the consequent multiplication of joints and surfaces of metal.

In settling the proportions of length and diameter in the arterial and subsidiary mains, the experience of the qualified engineer would be the best guide. Mr. Hawksley, Past President Inst. C.E., had rendered invaluable service by investigating the laws which governed the transmission of aeriform fluids through cylindrical pipes, and by determining, from experiment on a practical scale, the coefficient of friction for coal gas. The author was satisfied that mains and services could be laid practically free from leakage. If the condition of mains and services as laid could be preserved, no doubt leakage would practically disappear. Unfortunately, however, mains, once laid, were subject to disturbing influences, such as decay of material, subsidence of the soil wherein the pipes reposed, and, in large towns, the vibration due to heavy street traffic, as well as to contiguous railways. There was no satisfactory reason, however, for the high average per centage throughout the country. In the district of the Ratcliff Gas Company, which surrounded the Docks, and was consequently subject to vibration from the heaviest traffic, the total per centage of unaccounted-for gas, including other losses besides leakage, had, for two years, been within 6 per cent.; and the returns from various parts of the country indicated improvement in this direction.

As an argument for the importance of cheap construction, it was pointed out, that the maximum demand for gas extended only for about three weeks in the year, falling at midsummer by as much as two-thirds. The anomalous and varying rates at which gas was sold, not only throughout the country, but even within the limits of London, was explained by the varying proportions between the quantity of gas manufactured in each case and the amount of capital employed. The difference in the charge to the consumer was absorbed in meeting the higher charge for dividend which the company with the larger proportion of capital required. This difference no concentration or amalgamation could overcome; and the lesson taught to the engineer should be the importance of endeavouring, as far as in him lay, to develop the highest efficiency from the works with the lowest expenditure of capital.

AN ARTIZAN'S DWELLING HOUSE AND LAND SOCIETY.

THIS is about to be brought out under good auspices. It will have the distinctive feature of being governed entirely by representative workingmen. Mr. Shrivess, Mr. John Graham, Mr. C. Brag, Mr. E. Hawkins, all of them connected with trade organisations, also Mr. Blake, of the Foresters' Order, are among the promoters; and the services of Mr. George Savage, whose name will not be unfamiliar to our readers, and who is experienced in the cause of the true interests of the working man, have been secured as manager and secretary. Some novel features are to be introduced in the arrangements and design of the houses which have been prepared by the architect to the proposed society, Mr. Frank E. Thicke, of 5, Great Queen-street, Westminster, who has an intimate acquaintance with the requirements of the working classes so far as regards their dwellings. There are already indications that this society will meet with the success it deserves, and we shall watch its progress with interest, and hope to give fuller information on the subject hereafter.

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establishment of the INVENTORS' INSTITUTE, till his decease,
February, 1868. LORD RICHARD GROSVENOR, M.P.

President of Council:

SIR ANTONIO BRADY.

MEMBERS MEETINGS AT 8 P.M.

On Thursday, March 11th, R. J. BROWNE, Esq., on "Utilising
Wave Motion for Propelling Vessels."On Thursday, March 25th, JOHN HARDY, Esq., on "New
Traversing Crank for Motive Mechanism."The Lord Chancellor's Patent Law Bill to be considered on same
evenings.

Council and Executive Meetings on the same Evenings at 7 p.m.

Subscriptions are payable to Mr. G. A. STRETTON, the Receiver,
4, St. Martin's-place, S.W., who is the proper official to give re-
ceipts. F. W. CAMPIN, Sec.

Proceedings of the Institute.

On 28th January a *pro forma* council was held, and afterwards
an Executive Meeting, at which the question of papers for future
meetings was considered, and adjourned till next meeting.On the same evening, at the Members' Meeting, Captain
Bingham's paper on Rudders, published in our last, came on for
full discussion as adjourned; M. M. Harris, Esq., treasurer, in the
chair.Mr. J. McGregor Croft, having given much attention to the
subject, could express his approval of the form of the rudder, but
he questioned whether it was not better to have simplicity rather
than complication; and in this respect Captain Bingham's rudder
appeared to be objectionable. Moreover, he did not approve of
the great slant given to the rudder post.Mr. Rumble, C.E., said that this was evidently a telescopic kind
of arrangement, and thought that the sloped form of the rudder
proper would cause it, when the additional blades were projected
out of the slotted part, to be very weak.Dr. Croft then stated that he had formerly devised and tried
rudders which were cut away at the heel, and they had answered
well.Mr. Rumble coincided with Dr. Croft, remarking that breadth
of rudder was required at or near the line of flotation only; and
all surface below that line was superfluous, and only increased the
difficulty of steering the ship. Therefore, he thought Dr. Croft's
form of rudder a good one, and Captain Bingham's good also, so
far as it coincided with that form.The Chairman referred to the system of steerage in American
vessels as corroborating the above remarks.Mr. Campin remarked that the new rudders appeared to have
been applied to screw propelled ships only, and it might well be
that they would be good for that kind of ship and not available for
other vessels. With votes of thanks to the reader of the paper, to
which the names of Dr. Croft and Mr. Rumble were added, and
the chairman, the meeting ended.The meeting of Council and Executive on 11th February was
pro forma.

The Members' Meeting on the same day we give separately.

On 11th February the Council met *pro forma*, and afterwards
the Executive Committee proceeded to business, when Mr.
Browne's paper on Utilising Wave Motion for the Propulsion of
Vessels was agreed to be brought forward in March, the usual
routine business having been first transacted.On 11th February, at the Members' Meeting, a Conference on
the Patent Laws was held, a report of which is given in another
column.The special meeting of the Executive on February 22nd, and
the meeting on the 25th, will be found reported in another column.
Report of the Exposition of Sewing Machines in our next.

Monthly Notices.

Messrs. Macmillan and Co. will publish in the course of the
spring a work under the title of "The Unseen Universe; or,
Physical Speculations on Immortality." It is said to be the
joint work of two well-known physicists.

A light for photographic purposes has been produced by Mr.
Spiller, which is said to be free from the dangers attending the
new light obtained from nitric oxide and the bisulphide of
carbon. It has been exhibited to the Photographic Society,
when a fine light was produced by dropping small pieces of
brimstone into fused saltpetre, in a glass tube.

The origin and constitution of torbanite, or Torbane Hill
mineral, has had some light thrown on it by Mr. W. Skey,
chemist to the Geological Society, New Zealand. In prosecuting
some researches on the absorption of petroleum by clay, he
obtained a product resembling the natural substance, and he
suggests that if petroleum percolated through a bed of clay, the
argillaceous matter would abstract certain constituents from the
petroleum, and produce, if the action were not long continued,
an ordinary bituminous shale; but if the process proceeded until
the clay were saturated, a mineral substance like torbanite
would be obtained.

The presence of nitrogen in honey has often been questioned,
but Dr. de Planta Richenau, of Munich, by a number of varied
analyses, proves its existence, though only in proportion of
0.0781 per cent. It is found in three forms; 1, albuminous
substance coagulable by heat; 2, 3, other nitrogenous bodies,
one soluble and the other insoluble in alcohol; these latter sub-
stances he found in nectar, but the coagulable albumen not
occurring in the juice of the flowers, he considers a secretion by
the bee, which becomes mixed with the nectar. These researches,
which are not yet completed, will throw great light on the ques-
tion whether honey is, as some think, obtained directly from the
food of bees, or is elaborated by their organisms.

Clarite is the name of a new mineral of which Professor Sand-
berger, of Wurzburg, has published in the *Nenes Jahrbuch* a
preliminary description. It is found at Shapbach. Copper,
antimony, arsenic, and sulphur are said to be constituents.

The preservation of railway sleepers by sulphate of copper is
found to be unreliable according to the experiments of M. Max
Paulet.

The Casket for the City Address to the Emperor of Russia
appears to be a very satisfactory work of art, in the form of a
golden casket, to contain the illuminated scroll of the address,
and in the competition for manufacturing which Mr. Benson, of
Ludgate-hill, succeeded. The design adopted is an oblong case
of gold supported upon balls of solid malachite. The minor
ornamentation of the case is supplied by the heraldic insignia of
England, Russia, and of the City, but the principal artistic
detail is a miniature painting representing the delivery of the
address. The scene is enamelled upon a plate of gold 2½ in.
high by 4½ in. wide, which will be framed in the obverse side of
the casket, the reverse of the casket bearing an inscription.
Eleven figures are painted on these few square inches of surface,
and the tallest figure is 1 11-16 in. in height, while any of the
faces can be covered with the top of a pencil. In that small
space, however, the artist has given a life-like and effective
representation of the scene in Guildhall; and those who take
an interest in the glorification of civic beadledom will study
the details with pleasure. There are two other enamelled
miniatures to be placed in smaller panels of the casket, and
they represent the eastern and western ends of the Guildhall.
The risks to which this class of work is exposed are shown by
the fact that one of these two pictures (which are being
executed in England) has twice been painted, and has twice
shivered to pieces in the burning.

The Astronomer-Royal received last week a telegram from
Aden, announcing the welcome intelligence of the complete
success of the Transit of Venus party at Rodriguez Island, under
Lieut. Neate.

The Total Eclipse of the Sun on 6th of April next.—The prepa-
rations for the despatch of observers of this eclipse from this
country are making satisfactory progress, though hurriedly.

The Geology of the Central Part of the Chain of the Caucasus
is the subject of an interesting article in the current number
of the *Geneva Archives des Sciences*. It is from the pen of M.
Ernest Favre, who has on two occasions visited the district he
describes.

Proceedings of Societies.

ROYAL SOCIETY.

JANUARY 21ST.—The Right Hon. Lyon Playfair, V.P., in the chair. The following papers were read:—"On the Origin and Mechanism of Production of the Prismatic (or Columnar) Structure of Basalt," by Mr. R. Mallet, and "On the Anatomy of the Connective Tissues," by Dr. Thin.

JANUARY 28TH.—Dr. Hooker, C.B., President, in the chair.—The following papers were read:—"On the Theory of Ventilation: an Attempt to Establish a Positive Basis for an Air Space," by M. F. S. B. Francois de Chaumont,—and "On the Atmospheric Lines of the Solar Spectrum, illustrated by a Map drawn on the same Scale as that adopted by Kirchhoff," by Mr. J. B. N. Hennessey.

February 4th.—Dr. Hooker, C.B., President, in the chair.—The following papers were read: "Remarks on Prof. Wyville Thomson's Preliminary Notes on the Nature of the Sea Bottom, procured by the Soundings of H.M.S. 'Challenger,'" by Dr. Carpenter,—and a "Report to the Hydrographer on the Cruise of H.M.S. 'Challenger,' from July to Nov., 1874," by Prof. Wyville Thomson. Published by permission of the Lords Commissioners of the Admiralty.

February 11.—Dr. Hooker, C.B., President, in the chair.—The following papers were read:—"On the Structure and Development of Myriothela," by Dr. Allman,— "Some Particulars of the Transit of Venus across the Sun, Dec. 9, 1874, observed on the Himalaya Mountains, Mussoorie," and "Appendix to Note dated Nov., 1873, 'On White Lines in the Solar Spectrum,'" by Mr. J. B. N. Hennessey.

ROYAL SOCIETY OF LITERATURE.

JANUARY 27TH.—Major-General Sir C. Dickson, V.P., in the chair.—Mr. P. Gardner read a paper "On a Greek Inscription found by Mr. Calvert in 1874 at Hissarlik (Ilium Novum)." In this paper Mr. Gardner gave a transcript and a translation of this decree of the people of Ilium in favour of Malusios of Gargara, confirming to him the grants of a crown of gold worth 1,000 drachmas, in return for the good deeds he had done for that city, for the temple of Athene at Ilium, for the festivals held there, and for the league of cities; and especially, in that he had lent, free of interest, 300 gold staters towards the equipment of an embassy to Antigonus (King of Asia), with a further addition of 450 similar coins. The decree, in addition, granted to him and his descendants complete immunity from taxation, with the order that it should be engraved on a pillar, and set up in the temple of Athene; to the end that all men might know that the allied cities were ready to reward their benefactors. It is further stated that this pillar and inscription were to be kept in repair by the people of Gargara; while, towards the end of it, there is also the statement that, besides his other benefactions, Malusios had given 3,500 gold staters to the Agonothetæ, besides paying the debts they had incurred in a former year. The forms of the letters suggest the latter end of the fourth century B.C. as the probable date of this inscription, and from internal evidence we may presume it was engraved between B.C. 311 and 301. The larger donation of 3,500 staters must have represented a sum equal to £20,000 of our present money.

February 3rd.—Sir P. de Colquhoun, Q.C., V.P., in the chair.—Mr. Walter de Gray Birch read a paper "On the Classification of Manuscripts chiefly in Relation to the Classed Catalogue of the British Museum," in which he gave interesting and minute details of the contents of that magnificent collection. The great work of forming a complete classed catalogue of the whole of the MSS. in the British Museum is now

finished, and has been formally announced by Mr. Bond, the present Keeper, in the last Parliamentary Report. The catalogue extends to more than one hundred volumes, and great credit is due to those gentlemen who have zealously co-operated with Mr. Bond in carrying his plan into execution.

ZOOLOGICAL SOCIETY.

JANUARY 19TH.—R. Hudson, Esq., V.P., in the chair.—The Secretary called attention to a letter received from a correspondent in Ternate, Moluccas, in which it was stated that the writer had living examples in his possession of the *Paradisæa Papuana*, *Seleucides alba*, *Diphyllodes speciosa*, and *Ptilorhis magnifica*. Letters and papers were read: from Mr. J. Brazier, on ten new species of Australian Shells, from the collection of Mr. A. Coxen, of Brisbane, Queensland,—by Mr. A. G. Butler, on four new species of Butterflies of the genus *Protopogonius*, belonging to the collection of Mr. H. Druce,—from Messrs. P. L. Slater and O. Salvin, on three new species of South American Birds: these were proposed to be called *Microcerculus squamulatus*, *Automolus stratiiceps*, and *Tigrisoma Salmoni*,—by Prof. Newton, on a MS., in the French Archives de la Marine, which contained some additional evidence as to the original Fauna of Rodriguez. The Professor called special attention to the unknown writer's account of the terrestrial birds of that island, amongst which were mentioned the "Solitaire," the *Erythromachus leguati* of A. Milne-Edwards, and other now extinct forms,—from Dr. A. B. Meyer, Director of the Royal Natural History Museum, Dresden, on a new Bird of Paradise, skins of which had been sent to him by Mr. Van Musschenbroek, the Dutch Resident at Ternate, and which it was proposed to call *Diphyllodes Gulielmi III.*: The habitat of this bird is the inner mountains of Eastern Waigiou, from Major H. H. Godwin-Austen, supplementary to a former paper on the species of *Helicidae*, of the sub-genus *Plectopylis*.

February 2nd.—Dr. A. Günther, F.R.S., V.P., in the chair.—Mr. Slater exhibited and made remarks on a fine skin and skull of a female Huemul (*Cervus chilensis*) and a pair of horns of an adult male of the same animal, forwarded by Mr. Edwyn C. Reed, C.M.Z.S., of the National Museum, Santiago, Chili. Dr. E. Hamilton exhibited and made remarks on some deformed sterna of the common fowl. Professor A. H. Garrod read a paper on the Kangaroo called *Halmaturus luctuosus* by D'Albertis and on its affinities, in which such points in the anatomy of the type-specimen were described as served to explain its systematic position. It was shown from the form of the premolar and molar teeth, from the nature of the fur, and from other minor details that this species must be placed in the same genus as the *Dorcopsis brunii* (Müller), named more correctly *D. muelleri* (Schlegel). The species, therefore, should stand as *Dorcopsis luctuosa*, being the only other known species of the genus. It was also shown that *Dorcopsis* together with *Dendrolagus* form a well marked independent group of the Macropoid Marsupialia. Mr. Slater read notices of some rare Parrots now living in the Society's Gardens, and called special attention to examples of Goffin's Cockatoo (*Cacatuagoffini*) and Bouquet's Parrot (*Chrysotis bouqueti*) as being amongst the rarest specimens. A communication was read from Mr. Edward Bartlett, Curator of the Museum and Public Library, Maidstone, containing a list of the Mammals and Birds collected by Mr. Waters in Madagascar, amongst which was a fine adult specimen of the Madagascar River-hog (*Potamochoerus edwardsi*). A communication was read from Mr. E. P. Ramsay, containing remarks on the original skin of *Ptilonorhynchus rawnsleyi*, which he regarded as a hybrid between the Satin Bower-bird (*Ptilono-*

rhynchus holocericeus) and the Regent-bird (*Sericulus chrysocephalus*). Mr. R. Bowdler Sharpe read a paper entitled Contributions to the Ornithology of Madagascar, being his fourth communication on the same subject made to the Society. This paper contained descriptions of a new Accipitrine form proposed to be called *Eutriorchis astur*, a new species of *Atelornis*, proposed to be called *A. crossleyi*, a new form of *Nectariniidae*, to which the name *Neodrepanis coruscans* was assigned. Dr. Günther, F.R.S., read a paper on some Mammals recently collected by Mr. Crossley in Madagascar, amongst which were a new Lemur proposed to be called *Chirigaleus trichotis*, and a new form of Rodent, belonging to the Muridae, for which the name *Brachytarsomys albicauda* was suggested.

THE INSTITUTION OF CIVIL ENGINEERS.

At the meeting on Tuesday, January 12th, Mr. Thos. E. Harrison, President, in the chair, it was announced that the council had recently transferred James Blackburn, chief engineer to the Oriental Gas Company, Calcutta, and James Edward Whiting, ex-engineer, P.W.D., Bombay, from the class of associate to that of member; and had admitted the following as students of the institution, viz.: Alberto de Arteaga, William James Chalk, Hastings Charles Dent, George Jameson, Mahmood Labeeb, Henry Marsh, Walter Michels, Octavius Olavegoya, Edward Peto, Frederick John Littledale Rooke, Lionel Barrington Simeon, James Tilley Shand, Herbert Leslie Stokes, Charles Edward Sutton Townsend, Korshid Wahby, Alfred Ralph Watson, and James Frederic Wilson.

The second monthly ballot for the session 1874-75 resulted in the election of twenty-two candidates, viz.: John Widger Barnes, superintendent of Canal Irrigation, Bhawalpur State, Punjab, as a member; and Thomas Barham, Contractors' Staff of the Bury and Thetford Railway; Edward Bates, sub-engineer to the Continental Union and European Gas Companies; Thomas Wood Bourne, superintendent, Pigeon Coal Mines, Wurrora, Central India; Harold Copperthwaite, engineer of the Southern Division of the North Eastern Railway; James Henry Cunningham, Edinburgh; Harry Louis Davis, Engineer's Office, Great Eastern Railway; Henry Fajja, Bedford-row; Richard Tudor Frere, Lieut. R.E., ex-engineer, P.W.B., Bombay; George Henry Holt, Blackburn; James Kenward, Birmingham; Joseph Lobley, borough engineer of Hanley; Alexander McCulloch, Dundee; Drewry Gifford Ottley, assistant engineer, P.W.B., India; William Pearce, Sefton Park, Liverpool; Frank Salter, B. Sc. Stud. Inst. C.E., Bermondsey; Walter Thomas Chute, Langham-street; Benjamin Crispin Simpson, Haverstock Hill; Edmund James Smith, Whitehall Place; John Stokes, C.B., colonel R.E., Chatham; Rupert Swindells, Manchester; and Francis Edward Townsend, Stud. Inst. C.E., late Contractors' Staff of the Bury and Thetford Railway, as associates.

During the year 1874, the effective increase in the several classes composing the society was 159, thus distributed: viz., 29 members, 108 associates and 22 students. The numbers of the various grades are now 15 honorary members, 808 members, 1,375 associates, and 317 students, together, 2515.

At the meeting of this society on Tuesday, the 2nd ult., Mr. Thos. E. Harrison, president, in the chair, the paper read was by Professor Prestwich "On the Origin of the Chesil Bank, and on the Relation of Existing Beaches to past Geological Changes independent of the present Coast Action." It was announced that the Council, acting under the provisions of the bye-laws, had transferred Messrs. Alfred Mountain Fowler, Borough Engineer and Surveyor of Salford, and Robert Vawser, Engineer to the Corporation of Warrington, from the

class of associates to that of members; and had admitted Messrs. Percy Ruskin Allen, Francis Henry Deacon, Henry Robert Howells Martin, Oliver Stainton Pilkington, Arthur Wilson, and Edmund Richard Window as students. At the monthly ballot forty-one candidates were elected, including five members, viz.:—Messrs. Kennett Bayley, Rest. Engr., Northumberland Dock Railways; Richard Frederick Church, Westminster; Alfred Holt, Liverpool; Lindley William Paynter, Ex. Engr., P.W.D., Madras; and William Spooner Till, Borough Surveyor of Birmingham; and thirty-six associates, viz.:—Messrs. Harry Anstey, Westminster; Albert Otto Bieber, Westminster; Benjamin Biram, General Manager of the Peasley Cross and Sherdley Collieries; Frank Charles Black, Assist. Engr., P.W.D., India; William Joseph Brown, Grosvenor-road Engine Works; Charles Burton, Superintendent of Telegraphs for the National Government of the Argentine Republic; Francisco Correa de Mesquita Cardozo, Stud. Inst. C.E., Pernambuco; Charles Eckersley Daniel, Contractor's Staff, Portishead Docks; Edward George Davies, Ex. Engr., P.W.D., India; Saint John Vincent Day, Glasgow; Frederic Eliot Duckham, Rest. Engr., Millwall Docks; James Richard Fletcher, Stud. Inst. C.E., North Eastern Railway; Frederick Flood, M.A., Assist. Engr., Alexandra Docks, Newport; Philip Affleck Fraser, Knightsbridge; Joseph Jones Gardiner, Stud. Inst. C.E., Assist. Engr., Glenariff Iron Ore and Harbour Company, Antrim; James Hart, Fenchurch-street; Edward Hedley, Derby; Henry Percy Holt, Leeds; Henry Irwin, Ex. Engr., P.W.D., India; Charles Jones, Ealing; John Alfred Jones, South Indian Railway; John Hunter Jones, Stud. Inst. C.E., Nottingham and Melton Railway; Edward Baldwin John Knox, North Eastern Railway; Thomas William Large, Westminster; William Longworth, Engineer of the Gas Works, Dukinfield; Niel McDougall, Engineering Staff of the Controller of the Navy; Cathcart William Methven, Assist. Harbour Engr. of Greenock; Frederick Ernest Muntz, B.A., Westminster; Edmund Olander, Great Western Railway; Joseph Salter Olver, Westminster; John Pagan, Sheffield; George Edward Page, Stud. Inst. C.E., London and South Western Railway; Frederick Pattison, Rest. Engr., Public Works Office, New Zealand; Herbert George Hammond Spencer, Engineer-in-Chief to the Jersey Eastern Railway; Lionel Swift, Budge Row; and James Honiball Tozer, Westminster.

PHYSICAL SOCIETY.

JANUARY 16.—Professor Gladstone, President, in the chair.—Messrs. W. H. Perkin, C. H. Lemann, and W. Bottomley were elected members.—A paper was read, "On the Electrolysis of certain Metallic Chlorides," by Professor Gladstone and Mr. A. Tribe. If metallic copper be immersed in solution of cupric chloride, insoluble cuprous chloride is formed upon it. The authors found that if a platinum strip be joined to one of copper and the two immersed, the insoluble cuprous salt was also deposited upon the platinum. Attributing this result to the electrolysis of the cuprous salt by a feeble current, they tried the effect of a zinc-platinum cell excited by common water and with platinum electrodes in the cupric chloride. Cuprous chloride appeared at the negative, and chlorine at the positive electrode. An ordinary Grove's cell also gave cuprous chloride for the first two or three minutes, but afterwards metallic copper. A zinc and a platinum plate were joined and immersed in the cupric chloride; cuprous chloride was deposited upon the platinum, the edges being also encrusted with metallic copper. With magnesium in place of the zinc, a larger proportion of copper was obtained. Mercuric and ferric

chloride being analogous to cupric chloride induced the authors to experiment with them also. Precisely analogous results were obtained, mercurous and ferrous chlorides being obtained at the negative electrode.—A communication was made by Professor Guthrie "On Salt Solutions and Attached Water." Continuing the direction of research previously indicated, and the results of which were communicated to the society in November last, the author described the following facts. Contrary to the generally received opinion, the minimum temperature attainable by mixing ice with a salt is very independent of the ratio of the two and of their temperature and of the state of division of the ice. The temperature of a mixture of ice and a salt is as constant and precise as the melting points of ice. The nine salts resulting from the union of potassium, sodium, and ammonium on the one hand, and chlorine, bromine, and iodine on the other, were examined in reference to their cryohydrates, the temperatures of the formation of which range from -28° to -11° C. For the same halogen, sodium salts assume less water than ammonium, and ammonium less than potassium. For the same metal, iodine salts assume less water than bromine, and bromine salts less than chlorine. The result of the examination of thirty-five salts establishes the identity of the temperature at which the cryohydrate is formed with the temperature got by mixing the salt with ice. Only two apparent exceptions to this identity have been as yet observed. The temperature at which a cryohydrate is formed is, with similar salts, lower according as it assumes a less molecular ratio of water. There appear to be no exceptions to the rule, that the lower the temperature got by mixing the salt with ice, the lower the molecular ratio of water. The temperature of incipient solidification of spirits of wine of different strengths was also examined. It was found that from spirits containing more water than the four molecule hydrate pure ice was separated, and that the temperature gradually sank to -34° C., when the ratio of the four molecule hydrate was reached; thence the temperature remained constant and the whole solidified into a hard mass. When a spirit richer than this cryohydrate is cooled, the cryohydrate separates, and stronger and stronger spirit is left, which ultimately defies the source of cold to solidify it. Professor A. Dupré's experiments regarding the maximum temperature produced on diluting alcohol are singularly confirmed. For this experimenter showed that this very four molecule ratio produced the greatest heat in its formation. Ethylic ether, which dissolves water and is dissolved by it, seems to form a definite cryohydrate. Water saturated with ether solidifies at -2° C. without separation of ether. The icy mass so got, when ignited, burns with a colourless flame, the heat of which just suffices to melt the ice.

METEOROLOGICAL SOCIETY.

JANUARY 20TH.—Annual General Meeting.—Dr. R. J. Mann, President, in the chair.—Eighteen gentlemen were elected fellows, and the names of six candidates for admission were read. The secretary read the report of the council, which was received and adopted. The President delivered his address, in which he dwelt in detail upon the various measures carried out by the society during the past year, and in doing so alluded to the action of the Maritime Conference in forwarding uniform and contemporaneous operations on the part of meteorologists; the establishment of a uniform system of record by the combined action of the society and the Meteorological Office of the Government, which has been adopted by the Army Medical Department; and the starting of a considerable series of authorized and carefully inspected observatories, which have been planned upon a geographical base, so as to give a comprehensive grasp of

the meteorology of England, and so as to enable returns to be periodically made which present at a glance the leading features of climate and season. The value of these stations, it was pointed out, had been materially increased by a system of concerted action which had been agreed upon between the Meteorological Society and the Meteorological Office of the Government, and which it was intended to extend as the best and most available situations for other observatories could be determined upon. The President next spoke of the large addition that had been made to the usefulness of the society by the acquisition to its ranks of a considerable number of the most distinguished meteorologists of foreign lands; of the importance of a scientific alliance with the Public Officers of Health, who are now so closely connected with meteorological investigations; of the influence of exceptional seasons upon the health of the community; of investigations in progress with the climate, and especially the winter climate, of London, now of daily importance to some three millions and a half; of systematic observations of the influence of seasons upon animals and plants; of the formation by the society of a library of standard meteorological works; and of the introduction of close study of the physical condition and aspects of the sun in connection with changes of weather and vicissitudes of season—a subject which is now getting to be of surpassing interest on account of the brilliant discoveries and marvellous deductions that have recently been made in this noble branch of scientific research.—The following gentlemen were elected officers and council for the ensuing year:—President, Dr. R. J. Mann; Vice-Presidents, C. Brooke, H. S. Eaton, R. Field, and Capt. H. Toynbee; Treasurer, H. Perigall; Trustees, Sir Antonio Brady and S. W. Silver; Secretaries, G. J. Symons and Dr. J. W. Tripe; Foreign Secretary, R. H. Scott; Council, P. Bicknell, C. O. F. Cator, Dr. C. B. Fox, F. Gaster, W. J. Harris, J. P. Harrison, J. K. Laughton, R. J. Lecky, W. C. Nash, Rev. S. J. Perry, W. Sowerby, and E. O. W. Whitehouse.

GEOGRAPHICAL SOCIETY.

FEBRUARY 8TH.—Major-General Sir H. C. Rawlinson in the chair.—The following gentlemen were elected Fellows: Commander B. Telfer, Capt. C. Alexandersen, Capt. W. Neal, Capt. F. Spry, Lieut. C. R. Low, Messrs. W. Cotesworth, R. Johnston, R. R. Maynard, T. Mercer, G. M. Ogilvie, A. M. Robinson, T. Russell, W. F. Schafer, C. A. Taylor, and G. Wray.—The paper read was "On the Route towards the Pole for the Arctic Expedition of 1875," by Admiral G. H. Richards.

MATHEMATICAL SOCIETY.

JANUARY 14TH.—Prof. H. J. S. Smith, President, in the chair.—Mr. J. Hammond was admitted into the Society, and Mr. C. E. Bickmore was proposed for election. The following gentlemen were elected Ordinary Members:—Messrs. J. W. Russell, C. M. Leudesdorf, E. B. Elliott, H. M. Jeffery, C. Smith, and B. Williamson; and the following Honorary Foreign Members: Drs. Klein, Kronecker, and Zeuthen. Mr. J. W. L. Glaisher gave an abstract (in the author's absence) of two papers by Prof. Cayley, "On the Potentials of Circles and Ellipses," and "On the Attraction of an Ellipsoidal Shell." Mr. J. Hammond read his paper, "On the Solution of Linear Differential Equations in Series." Major J. R. Campbell explained the construction and use of his Mechanical Calculator, and presented two of the instruments to the Society. Mr. Sylvester made a brief communication "On the Representation of any Unicursal Curve and its Nodes in Terms of the Parametric Co-efficients, and on Roberts's and Hart's Cases of Unicursal 3-bar Motion." M. C. Jordan and Prof. Clifford spoke on the subject of this last communication.

MICROSCOPICAL SOCIETY.

FEBRUARY 3RD.—C. Brooke, Esq., President, in the chair.—Mr. S. H. Roberts and Mr. T. W. Cowan were elected Fellows.—The annual report of the council was submitted, and showed that the library, cabinet, and instruments were in a satisfactory condition; that seventeen new Fellows, one Honorary Fellow, and one Corresponding Fellow, had been elected during the year, and that nine had been removed by death. The statement of accounts showed a balance in hand of £153 7s. 6d. The President read the annual address, in the course of which he reviewed the general progress of microscopical science during the past year, briefly noticing the various topics which had engaged attention, and the chief improvements in apparatus which had been introduced. A short *resume* of some of the more important papers contributed was also given, and the address concluded by the customary obituary notices of Fellows deceased. A vote of thanks to the president for his address and for his services during the year was carried. The result of the ballot for officers and council for the ensuing year was as follows:—President, H. C. Sorby; Vice-Presidents, Dr. R. Braithwaite, C. Brooke, Dr. J. Millar, and Dr. W. B. Carpenter; Treasurer, J. W. Stephenson; Hon. Secretaries, H. J. Slack and C. Stewart; Council, F. Crisp, J. E. Ingpen, S. J. McIntire, H. Lee, W. T. Loy, Dr. Lawson, Dr. J. Matthews, G. Shadbolt, C. Tyler, F. H. Ward, F. H. Wenham, and C. F. White; Assistant Secretary, W. W. Reeves.

GEOLOGICAL SOCIETY.

JANUARY 27TH.—J. Evans, Esq., President, in the chair.—Messrs. A. Heatherington, J. Cliff, H. Wagner, F. Gillespie, R. N. Worth, J. Cowlishaw, F. Warwick, R. D. S. Stephens, C. Smith, and F. Oats, were elected Fellows.—The following communications were read:—"On the Structure and Age of Arthur's Seat, Edinburgh," by Mr. J. W. Judd,—and "The Glaciation of the Southern Part of the Lake-District, and the Glacial Origin of the Lake-Basins of Cumberland and Westmoreland," second paper, by Mr. J. C. Ward.

ANTHROPOLOGICAL SOCIETY.

At a meeting of the Society on the 12th ult., Dr. Charnock, F.S.A., President, in the chair, the following papers were read:—"Literary Dutch in Old English Provincialisms," by Dr. A. V. W. Bickers. The author endeavoured to support certain points of the Schleicherian evolution theory as applied to linguistic phenomena. Dr. Simms of New York exhibited and described several Egyptian skulls (some ancient), and remarked on the corresponding habits of the ages which they represented. Dr. Carter Blake, Mr. H. B. Churchill, Mr. A. L. Lewis and the President joined in the discussion.

CHEMICAL SOCIETY.

JANUARY 14TH.—Prof. Odling, President, in the chair.—A paper "On the Action of Organic Acids and their Anhydrides on the Natural Alkaloids," part III., by Mr. G. H. Beckett and Dr. C. R. A. Wright, was read by the latter. It is a continuation of their researches on the opium alkaloids, morphine and codeine. The next communication was a "Note on the Effect of Passing the Mixed Vapours of Carbon Bisulphide and Alcohol over Red-hot Copper," by Mr. T. Carnelley. Dr. Armstrong then read a paper "On the Iodonitrophenols."

The Society for the Promotion of Scientific Industry has completed the first volume of its *Journal*, which contains excellent papers on Bleaching, on the Chemistry of Calico Printing and Dyeing, and several other matters.

COMPULSORY LICENCES.

THE meeting of the Inventors' Institute, February 11th, was devoted to the discussion of the question of compulsory licences.—Mr. F. H. VARLEY, vice-president of the council, occupying the chair.

Mr. A. H. MURRAY opened the discussion by moving that the system of compulsory licences would be so inimical to the best interest of inventors, that it ought not to be insisted upon.

This having been duly seconded,

Mr. MURRAY proceeded to support it by stating that the adoption of this system would, in every way, deteriorate the patent-right, as the use of it would not be at the absolute disposal of the patentee, and in cases where he sought to reserve his invention for his sole use in his own manufactory or shop, he would be embarrassed by the uncertainty as to whether large capitalists would not be stepping in and demanding licences, the working under which by such men would ruin the patentee's business. Moreover, the carrying out of the system would present such practical difficulties as to the basis of assessment of royalty and so forth, that the system must prove a most unsatisfactory one.

Mr. J. M. HYDE also supported these views, as he was totally opposed to legal encouragement being given to trade competition, and it was clear that compulsory licences would create a system of competition in which a patentee's invention might be rendered unpopular in consequence of bad workmanship and trading rascality of all kinds which might be practised in connection with it. To his mind, the patent system was most advantageous in regard that it was a great bulwark against the overwhelming power of unscrupulous free trading. He, therefore, heartily supported the motion.

Mr. CALLEY also supported the motion.

Mr. NEWTON WILSON opposed the motion, stating that, as he considered the patent to be a grant of privilege from the Crown, so he held that the Crown had a perfect right to attach to it conditions and limitations, and as a practical matter he considered compulsory licences would be perfectly justifiable and advantageous, provided of course that they were limited to cases where they were practically needed, and it appeared to him that a great deal that had been stated on this subject only amounted to arguments for carefully regulating the use of the system.

Mr. LANCASTER supported Mr. Wilson's views as to the practical value of compulsory licences, though he could not agree with him that on equitable principles a patent was a mere grant of privilege, for it ought to be a legal acknowledgment of a just claim.

Mr. SAVAGE, speaking on behalf of the working classes, supported Mr. Wilson's views, for he thought that the effect of the system of compulsory licences being set on foot would create a regular demand for the use of inventions by manufacturers, which would be a matter of the greatest advantage to artisan inventors. All that he had heard that night showed that this system was not objectionable, except in regard to its liability to misapplication, and it appeared to him that the Institute would do well to direct its attention to settling the rules which had better be applied to the grant of compulsory licences.

Mr. M. M. HARRIS thought there was much to be said on both sides of the question; but after giving due weight to the same, he thought the Institute could not undertake to support the proposed system. There were evidently many persons in favour of it, but more opposed to it; therefore it was clear that a unanimous vote would not be arrived at; and as it was a matter that could not be settled by a bare majority, he suggested that the motion be not pressed to a vote.

Mr. CARTTAR remarked that the views of Mr. Wilson were, to his mind, very erroneous. It was clear that in the first instance the inventor was a possessor of a secret, which secret was either valuable or worthless; if valuable, he ought to be paid for it, and a patent was in the nature of a payment for it; and even if the secret were worthless, it was worth while to know that fact; and the issue of the patent would do no harm even then, because no one would pay the inventor for a worthless matter. This being so, the basis of patents was Right, and not Privilege. Moreover, it was self-evident that the working of the compulsory licence system would be so difficult that it could not be recommended by the Institute.

After some explanations by Mr. CAMPIN as to the present law,

The CHAIRMAN remarked that they had heard a great deal about privileges and rights. The inventor's privileges were generally very poor affairs, and as to his rights, he thought they wanted to be righted. He did not like compulsory licences, but as there seemed to be such a strong demand for them, he would suggest that infeasible patents should go with compulsory licences, for otherwise there would be endless difficulties arising between patentee and his licensee, who would not expect to pay royalty if the patent became defeasible or bad in law. He agreed with Mr. Harris that the motion had better not be pressed to a vote.

This having been assented to, with a vote of thanks to the Chairman, the meeting ended.

THE LORD CHANCELLOR'S BILL AND THE INVENTORS' INSTITUTE.

A special meeting of the Executive of the Institute was held at 4, St. Martin's-place, Trafalgar-square, on Monday, 22nd ult., Capt. J. H. Selwyn, vice-president of the Institute, occupying the chair, when the Lord Chancellor's Patent Law Bill was fully considered and discussed, and, after some observations by the chairman as to the objectionable character of the measure in regard to the nature and extent of the proposed preliminary examination, and the enactments as to examiners, referees, and compulsory licences; also as regarded several other provisions of the Bill, which, while rendering patent proceedings ultra-litigious, would afford no greater security in the possession of patent rights than at present, and effect no reduction, but rather an increase, of Government charges now so loudly complained of, and would shorten the duration of patents. On the motion of Mr. Varley, vice president of the Council, seconded by Mr. C. G. Carttar, a resolution to the following effect was passed unanimously:—"That it is desirable that a meeting of all parties taking an interest in the alterations in the Patent Laws, to be effected by the Lord Chancellor's Bill, should be promoted by this Institute, and held without delay. That the same be held at the hall of the Society of Arts if obtainable for the purpose, and that it is desirable, in order to ensure vigorous action, that a special fund be raised to meet the expenses specially connected with this matter."

Mr. F. W. Campin, the secretary, and the mover and seconder, were afterwards appointed to carry out this resolution in conjunction with the other officers of the Institute.

On Thursday, the 25th, the Council received the report of the above proceedings, and affirmed the same. It was also agreed that the Lord Chancellor and other members of the House of Lords should, in order to forward the views of the Institute, be communicated with.

INVENTOR'S PARADISE.

"A thousand patents," says Haseltine, Lake, and Co.'s Circular, "are granted every month in the United States for new inventions. This number exceeds the aggregate issue of all the European States, yet the supply does not equal the demand, and the average value of patents is greater in America than in Europe by reason of the vast number of new industrial enterprises and the higher price of manual labour. A hundred thousand dollars is no unusual consideration for a patent-right, and some are valued by millions. The annual income from licences granted on the Blake sole sewing machine is over three hundred thousand dollars—sixty thousand pounds—and other patented inventions are equally profitable. Inventors are encouraged by the moderate Government fee of thirty-five dollars, which secures an invention for seventeen years without further payment. The rights of patentees are generally respected by the public, and no National Legislator, with a single exception, has ventured to propose the abolition of a system which at once secures substantial justice to inventors, and proves of incalculable advantage to the nation."—*Anglo-American Times*.

APPLICATIONS FOR LETTERS
PATENT.

Continued from page 34.

R. Hedley. Apparatus with hydraulic duplex action for raising and lowering boats to and from ships, chiefly intended for raising and lowering steam launches.—W. C. Johnson. Grapnels for raising submarine cables.—E. Walker. Method of arranging or fitting tubes in boilers, and for protecting the tube ends from the direct action of heat (com.).—W. E. Bovill. Boilers for steam ships.—G. Eyre. Apparatus for warming and ventilating.—J. L. Clark and J. Standfield. Towing vessels along rivers and canals.—H. Bessemer. Construction of saloons, cabins, floors, and platforms having axial motion on board ship, and apparatus employed for regulating and controlling their motion. (Complete specification).—J. C. Brockbank. Apparatus for stamping and registering tickets, applicable also to other purposes where stamping and registering is required.—A. Evans. Trunks and like receptacles for containing wearing apparel and other requirements, also applicable to deed boxes, cash boxes, and other like articles.—G. F. James. Circular braiding machines.—E. Perrett. Filters, and method of cleaning the same.—A. M. Clark. Wringing and other machines (com.).—A. M. Clark. Washing machines (com.).—R. N. Allen and A. B. Pullman. Railway wheels.

On December 11th.—4266 to 4276.—W. Raven. Apparatus applicable to circular machines for making ribbed looped fabrics.—J. L. de Montoisson. Tanning skin and hides.—W. Stevenson. Lubricating the axles of window pulleys.—J. O'G. Cave. Obtaining motive power.—J. Hill and J. E. Hey. Ventilators.—H. H. Murdoch. Screw taps (com.).—J. C. Shaw. Construction of tramways.—J. Midgley. Carding engines.—A. M. Clark. Apparatus for washing linen and other textile fabrics (com.).—A. M. Clark. Apparatus for grappling and raising submerged objects (com.).—W. Hartnell. Tooling bolts and nuts.

On December 12th.—4277 to 4291.—W. E. Whale. Construction of combined corset and dress-improver (com.).—D. Halpin. Floating docks.—E. Stott, W. C. Stafford, and T. Taylor. Apparatus for lubricating the spindles employed in machinery for spinning, doubling, or twisting fibrous materials.—W. Lee. Construction of universal chucks used in lathes and other similar machines.—W. W. Smith. Anchors.—J. H. Johnson. Manufacture of hats and other coverings for the head (com.).—J. H. Johnson. Lamps, parts of which are applicable to spring or clock movements generally (com.). (Complete specification).—G. Greig. Apparatus for distributing manure.—F. G. Morton. Method of and apparatus for separating coatings of tin, solder, or zinc, or combinations thereof from iron.—G. G. Tandy, and F. H. Smith.

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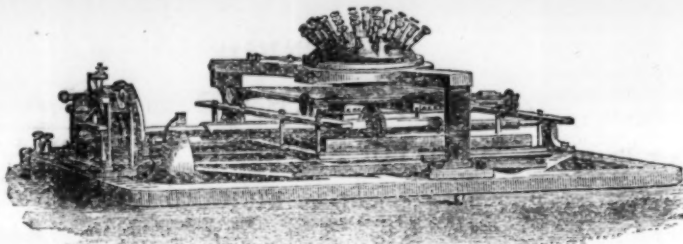
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